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A SUMMARY OF TOTAL SOLAR AND SKY RADIATION MEASUREMENTS IN THE UNITED STATES

By IRVING F. HAND

[Weather Bureau, Washington, August 1940

The purpose of this paper is to present a summary to date of the total solar and sky radiation measurements made by the Weather Bureau and cooperating institutions and individuals; the data are presented in tabular form, and also graphically by 18 isopleths.

Stations.—Table 1 gives information about the solar radiation stations which are maintained by, or cooperate with, the Weather Bureau. A description of each of these stations will be found in the MONTHLY WEATHER REVIEW for December 1937, page 418.[1] Not all of the stations here listed have been included in the present summary: To obtain as equitable a distribution of stations throughout the United States as practicable, some were omitted which would have given too much weight to one region; again, at some of the cooperating stations, the register clock for one reason or another was kept either on standard time or on time so uncertain that considerable distortion occurred, causing an asymmetry of the record about the noon line. A distortion is noticeable on a few of the summaries here published, but in some cases is due to systematic fogginess during early morning, cloudiness just preceding sunset, or to other natural causes; it does not affect the values of the daily totals, but alters the diurnal distribution.

[1] Irving F. Hand. Review of United States Weather Bureau Solar Radiation Observations. MONTHLY WEATHER REVIEW 65: 415-441, 1937.

Instrumental equipment.—Table 1 also lists the instruments in use at the stations. At the present time, with the single exception of Miami,[2] Eppley thermoelectric pyrheliometers [3] of either the 10 or 50 junction types are used as receivers. In order to obtain as nearly uniform and accurate results as possible, this instrument has been designed to conform to the following specifications:

(1) It should be sensitive to radiation of wave lengths between 0.295 and 2.5μ. (See fig. 1.)

(2) It should be proof against wind, weather, and moisture.

(3) The receiving surface should remain of constant sensitivity.

(4) The receiving surface must be so designed that the reduction of its readings to gram-calories or other units will give comparable results with measurements taken elsewhere in accordance with standard pyrheliometric practice.

(5) The receiving surface must be nonselective in its reaction to radiation of different wave lengths.

[2] At Miami the Callendar electrical resistance pyrheliometer, recording on an automatic Wheatstone bridge, is used and has the advantage of a quartz cover. This instrument was described by H. H. Kimball in the MONTHLY WEATHER REVIEW, August 1914, pp. 474-487.

[3] Herbert H. Kimball and Hermann E. Hobbs. A new form of thermoelectric pyrheliometer. MONTHLY WEATHER REVIEW 51: 239-242. Also *Jour. Opt. Soc. Amer.* 10: 365-368, 1925.

TABLE 1.—*Pyrheliometric stations*

Station	Under direction of—	N. lat.	W. long.	Altitude	Instruments		Remarks
					Receiver	Recorder	
		° ′	° ′	*Feet*			
San Juan	U. S. W. B.	18 28	66 06	85	Eppley	Engelhard	Good exposure on narrow peninsula, but some interference from salt spray. Cooperation with Columbia University.
Miami	Dr. O. J. Sieplein	25 41	80 12	50	Callendar	Callendar	Fair exposure on Belle Isle, a narrow key just east of Miami.
New Orleans	Tulane University	29 56	90 07	100	Eppley	L. & N. potentiometer.	Good exposure; considerable cloudiness.
La Jolla	Scripps Institute of Oceanography.	32 50	117 15	85	do	Engelhard	Splendid exposure a few yards inland from Pacific Ocean. Early morning fogs prevail during part of year.
Riverside	University of California.	33 58	117 28	1,051	do	do	Excellent exposure in midst of citrus fruit region.
Fresno	U. S. W. B.	36 43	119 49	330	do	do	Good exposure at airport northern edge of city. The San Joaquin Valley has an exceedingly high percentage of sunshine.
Washington	do	38 56	77 05	397	do	Engelhard and L. & N. potentiometer.	Good exposure on second highest point in District of Columbia. 5½ miles NW. of United States Capitol. Some vitiation from city smoke.
New York	do	40 46	73 58	180	do	Engelhrad	Fair exposure at Central Park Meteorological Observatory. Values vitiated by large city atmospheric contamination.
Lincoln	do	40 50	96 45	1,225	do	L. & N. potentiometer.	Excellent exposure on experimental farm, NE section of city. Results very representative of the Great Plains area. Some dust.
Chicago	do	41 47	87 25	688	do	Engelhard	Good exposure on roof of Rosenwald Hall, University of Chicago. A great deal of smoke.
Blue Hill	Harvard University	42 13	71 07	640	do	Engelhard and L. & N. potentiometer.	Excellent exposure on high ridge 10 miles south of Boston. With northerly component winds, some smoke contamination from Boston.
Twin Falls	U. S. Bureau of Entomology.	42 29	114 25	4,300	do	Engelhard	Good exposure on high plateau in rich farming country. Greatest elevation of any station here listed; exceeded only by Albuquerque where observations were recently begun.
Madison	U. S. W. B.	43 05	89 23	974	do	L. & N. potentiometer.	Excellent exposure, North Hall, University of Wisconsin. Rapid growth of city has added to atmospheric vitiation recently.
Friday Harbor	University of Washington.	48 32	123 01	15	do	Engelhard	Good exposure 50 miles NW. of Seattle directly on ocean; considerable fog interference.
Fairbanks	U. S. W. B.	64 52	147 39	500	do	do	Most northerly station of this kind in the world. Very little artificial contamination.

(6) The readings should not be influenced by temperature variations, that is, the sensitivity should be proportional only to the amount of incident radiation.

(7) The instrument should not reradiate to the sky.

(8) The receiving surfaces should be exposed to the entire sky hemisphere.

(9) The receiving surfaces should be flat.

(10) The hemispherical glass cover should be flawless, and of ample size to prevent "caustics" and shadow effects from striae.

When the instrument was designed, it was assumed that the cosine law would hold, that is, that the decrease in radiation with increased zenith distance would be proportional to the cosine of the zenith angle. Unfortunately, it has been found during calibrations of these instruments, and during an intensive study of their characteristics by Hoyt C. Hottel of the Chemical Engineering Department of Massachusetts Institute of Technology, that this law does not hold for low sun.

In the original description of this pyrheliometer, Kimball[4] mentions an apparent paradox, as follows:

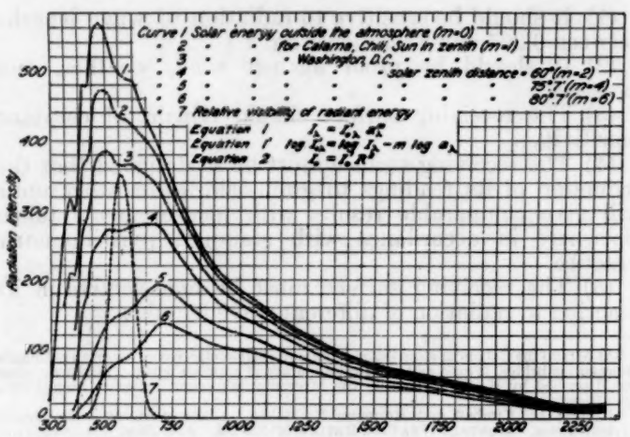

FIGURE 1.—Normal spectral curves of solar radiation; I, outside the atmosphere; II, air mass 1.1 (Zenith distance, Z=25°); III, air mass 2.0 (Z=60°); IV, air mass 3.0 (Z=70.7°); V, air mass 5.0 (Z=78.7°); VI, visibility curve for solar radiation; VII, energy curve for skylight, Mount Wilson, Calif.

"The efficiency of the thermopile appears to increase with temperature difference." "A slight tendency is noted for the thermopile to read relatively low in the middle of the day." Actually, however, these two statements may be correct; for while the efficiency of the thermopile may increase at noon when we expect the maximum radiation of the day, the tendency for the relatively lower readings at this time may be because the tips of the hemispherical glass covers always lack the optical perfection of the remainder of the glass.

In order to minimize the errors just mentioned we have weighted the calibration factors so that the final calculations of the total radiation for the day are very close approximations to the true values. However, should values of great precision be required, it is necessary to use a variable factor for different altitudes of the sun. For purposes of solar climatology, however, the use of variable factors is not warranted; therefore all values here given have been obtained by the employment of a fixed factor for each combination of pyrheliometer and recorder.

The recording instruments in use at the stations here described, include both the recording potentiometer,[1] which eliminates almost entirely errors arising from free air and other temperature changes; and the recording microammeter.[1] When the latter instrument is used, enough external resistance is inserted in the circuit to avoid excessive errors arising from temperature changes of all kinds. Both instruments are rugged; and with ordinary care, such as should be given any physical instrument, will function without undue trouble for many years.

Distribution of records.—Stations for making this type of measurement have been successively established during a long interval, and it therefore is impracticable to obtain means for the same number of years at each station. The records for the 4 years 1936–39 were tabulated for 11 of the stations; and for considerably longer periods for some of the stations which have been in operation longer and where the data are considered of major importance. Only 3 years' records from San Juan have been tabulated, as that station was opened in 1936 and the records for 1939 are defective.

When interpreting the records it should be borne in mind that this period of 1936–39, inclusive, was one of generally higher than normal solar radiation in the United States.[5] Four-year means may vary considerably from means of 20 or more years. With data from only 4 years, a single outstanding week of continual sunshine or of continual cloudiness can create marked irregularities in the isopleths that are without significance; but with isopleths based on data over many years, as in the case of Washington, Chicago, and Lincoln, and also the composite of 10 stations, considerable significance must be attached to the irregularities.

Interpretation of the records.—At the stations in the continental United States maintained by the Weather Bureau, the maximum radiation during the year occurs during the week beginning July 2, with the single exception of Madison where the maximum occurs a week later. In fact, a midsummer secondary minimum occurs close to the time of the summer solstice at most stations; La Jolla and Miami—both coastal stations—are notable exceptions.[1]

The percentage departures of the new long-period means from the means of all values up to and including 1936 at Washington, Lincoln, and Chicago are +1, −1, and +1 respectively. The 4-year mean departures from the means of all values up to and including those for 1936 are considerably greater at the other stations; and generally are plus, notably at New Orleans, La Jolla, and Fresno. Plus departures are to be expected in a period when no volcanic eruptions occurred of the type that emits dust into the stratosphere in large quantities; the eruptions of Krakotoa in 1883, Pelée in 1902, and Katmai in 1912 were each followed by a marked decrease in solar radiation receipt at the surface of the earth.[6] The average plus departures of the stations here tabulated are close to the average plus departures of normal incidence radiation for the same period at Washington, Madison, Lincoln, and Blue Hill.[6] Should one wish to convert these 4-year averages to values more closely approximating long-period means, the use of the factor 0.97 is suggested.

On the average for all stations, the mean of the maximum and minimum weekly values departs from the annual mean by 3 percent. New York, Blue Hill, Fresno, and Miami show the largest departures. At New York there is considerable smoke during most of the year, with a few weeks outstanding for their relative clearness.

[1] Irving F. Hand, Review of United States Weather Bureau Solar Radiation Observations. MONTHLY WEATHER REVIEW 65: 418–441, 1937.

[4] Kimball, Herbert H., and Hobbs, Hermann E. A New Form of Recording Pyrheliometer. MONTHLY WEATHER REVIEW 51: 239–242, 1923.

[5] Irving F. Hand. Variation in Solar Radiation Intensities at the Surface of the Earth in the United States. MONTHLY WEATHER REVIEW, 67: 338–340, 1940.

[6] Irving F. Hand. Variation in Solar Radiation Intensities at the Surface of the Earth in the United States. MONTHLY WEATHER REVIEW 67: 338–340, 1939.

This might explain to some extent why the mean of the maximum and minimum weeks is relatively higher than otherwise would be expected. The same explanation serves for Blue Hill, where smoke from Boston affects the values when the wind has a northerly component. At Fresno we assume that the departure is negative for reasons exactly the opposite to those just given; that is, this station has exceptionally clear skies during most of the year. We believe the apparent discrepancy at Miami may be because at this station pyrheliometric apparatus of foreign manufacture was substituted some years ago for the original equipment and there is some uncertainty as to the pyrheliometric scale upon which this latter apparatus was calibrated. The annual mean of the composite group of 10 stations used in the composite plot is only 0.1 percent higher than one-half the sum of the maximum and minimum weeks.

The effect of latitude is markedly shown by the fact that during the week beginning December 3 the average radiation at San Juan is 73 times that at Fairbanks; the average weekly radiation at San Juan for the year is only 1 percent less than the maximum weekly radiation at Fairbanks; this latter value is 88 times the minimum weekly radiation at that station. At San Juan the maximum value is only twice as great as the minimum. Fairbanks is the most northerly station in the world at which this type of measurement is regularly made.

Angot [7] has prepared extensive tables giving the relative amounts of radiation which would be received on a horizontal surface at all latitudes were there no atmosphere. According to these tables we would expect 1.73 times as much radiation at San Juan as at Fairbanks, were there no atmosphere. Actually the values for San Juan are 2.30 times as large as the Fairbanks values. The average yearly cloudiness at Fairbanks is 6.4 and at San Juan it is 4.9, on a basis of 10 for total cloudiness. These values satisfy very closely the proportion, 2.30:1.73: :6.4:49; but we would not expect, nor do we find, such close agreement between stations where the atmosphere is vitiated by local fog, smoke, dust, etc., or where differences in altitude are great. In general, Angot's tables cannot be used to estimate with precision the radiation receipt at any given point.[8] For example the annual radiation receipt at Fresno is 26 percent greater than that at New Orleans, although the latter station is 7° lower in latitude. Likewise the Twin Falls values are 37 percent higher than the Chicago values, although both stations are close to the same latitude.

[7] Angot. *Ann. Bur. Cent. Météorol.*, Pt. 1, 1883.
[8] Mayerson, H. S. and Laurens, Henry. Total solar radiation at New Orleans, La. MONTHLY WEATHER REVIEW, 62: 281–286, 1934.

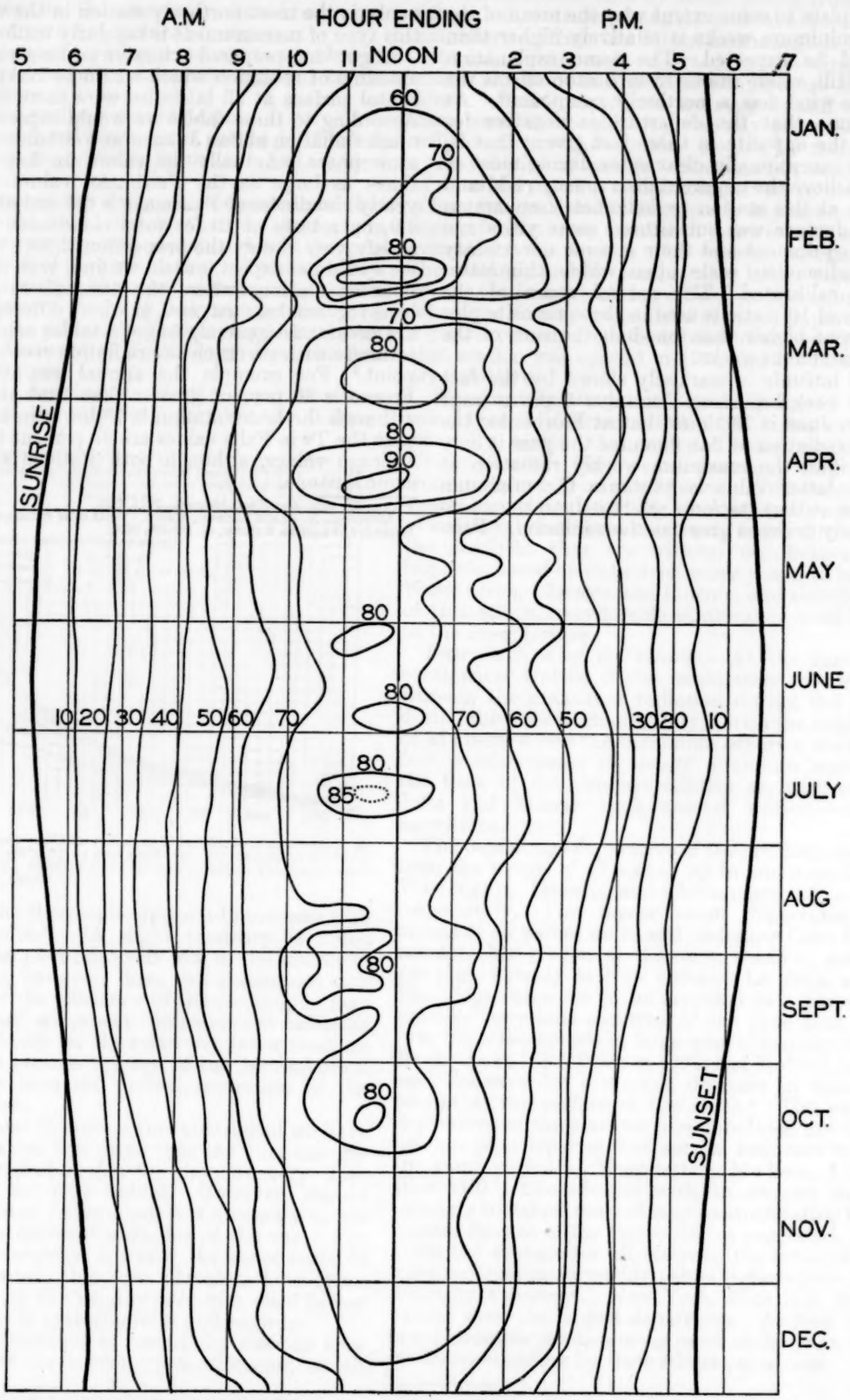

FIGURE 2.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at San Juan, throughout the year. See table 2.

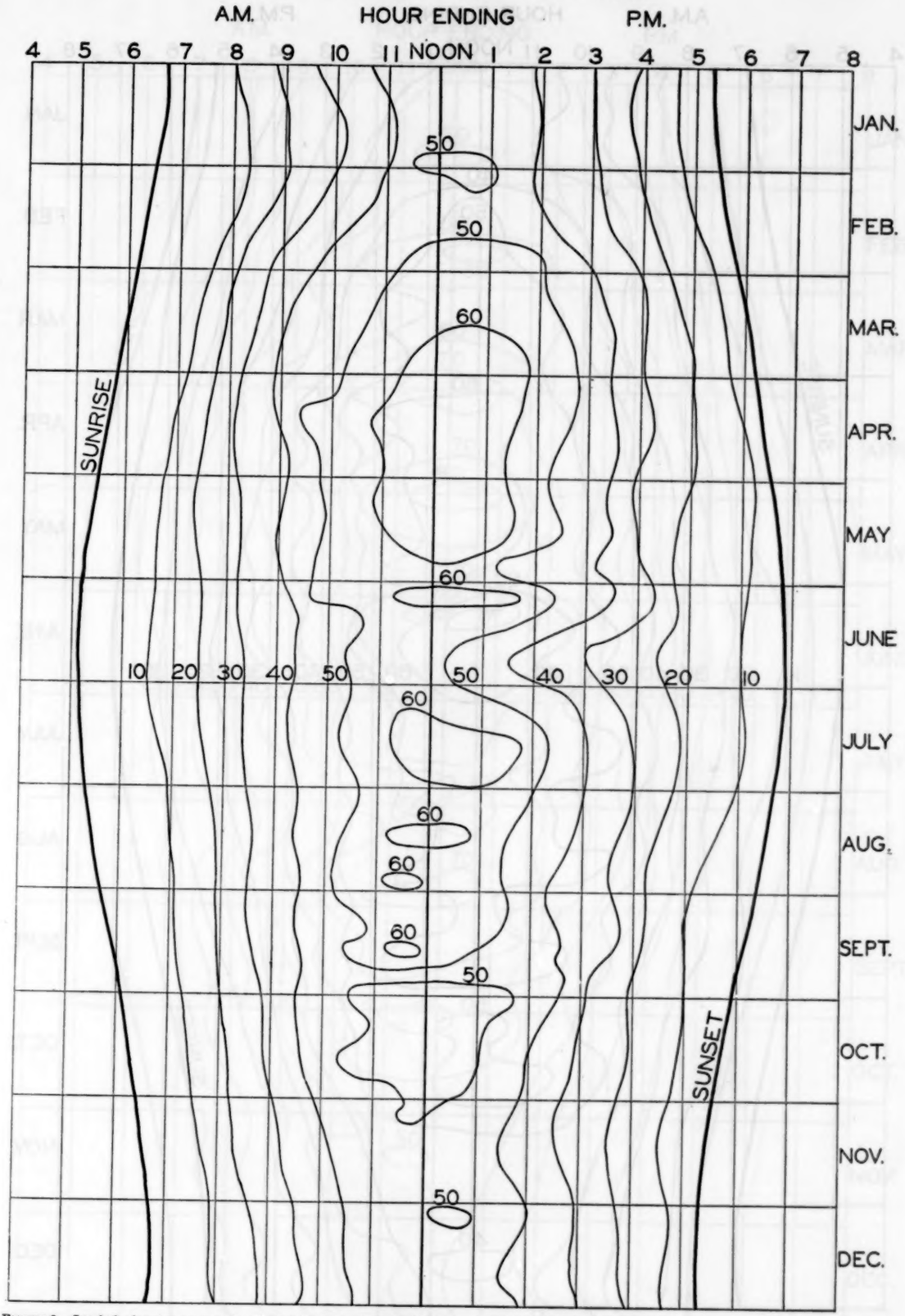

FIGURE 3.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Miami, throughout the year. See table 3.

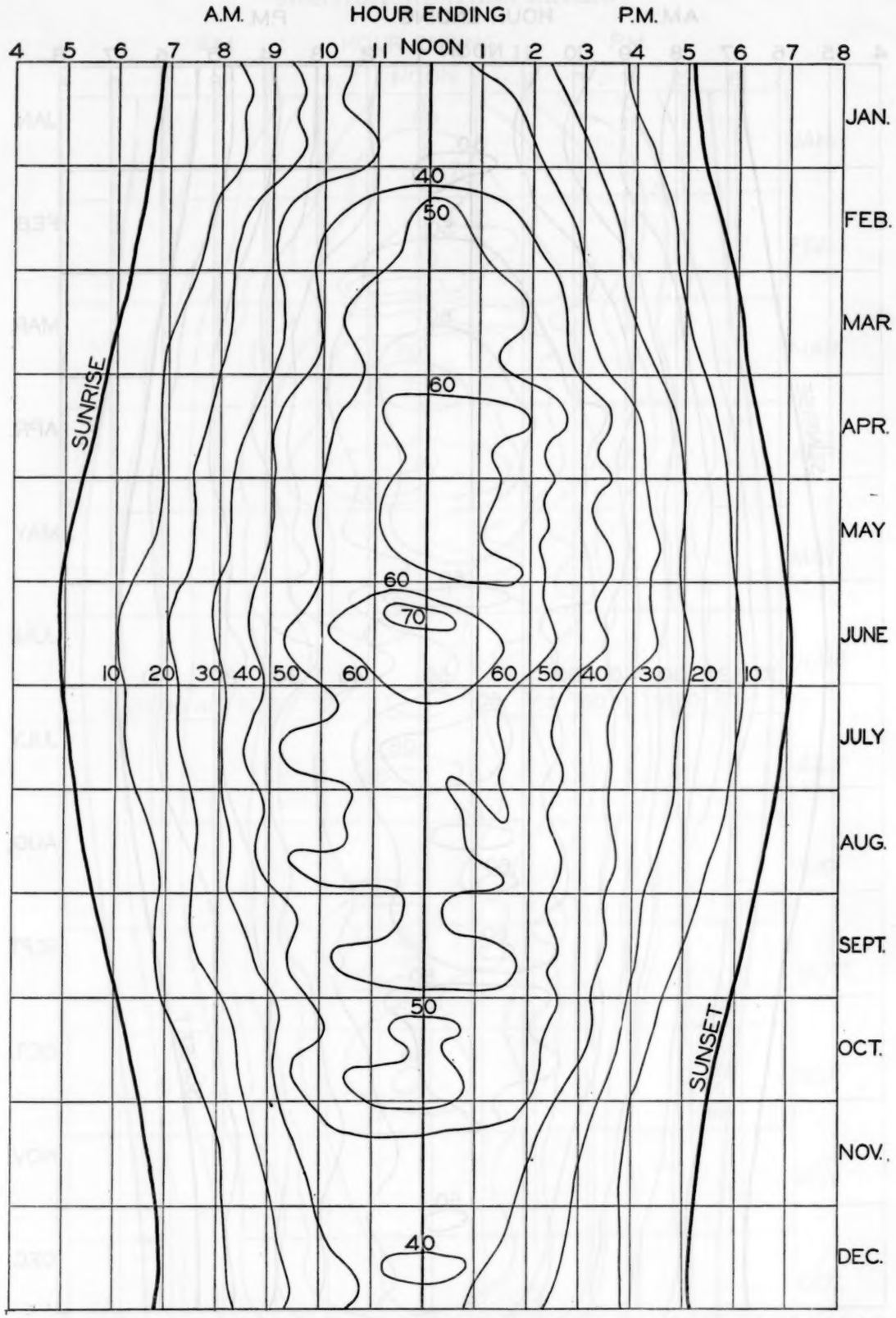

FIGURE 4.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at New Orleans, throughout the year. See table 4.

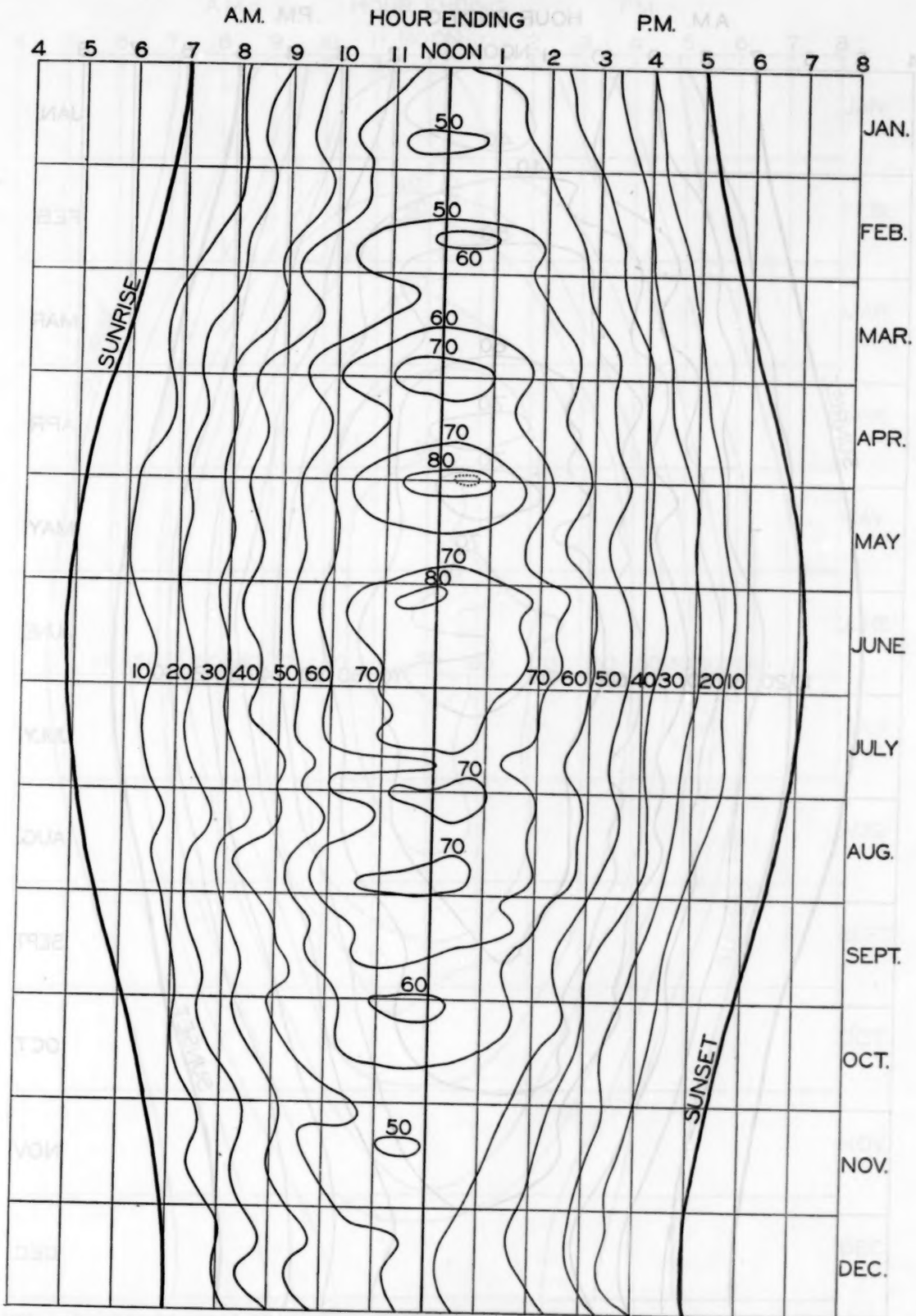

FIGURE 5.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at La Jolla, throughout the year. See table 5.

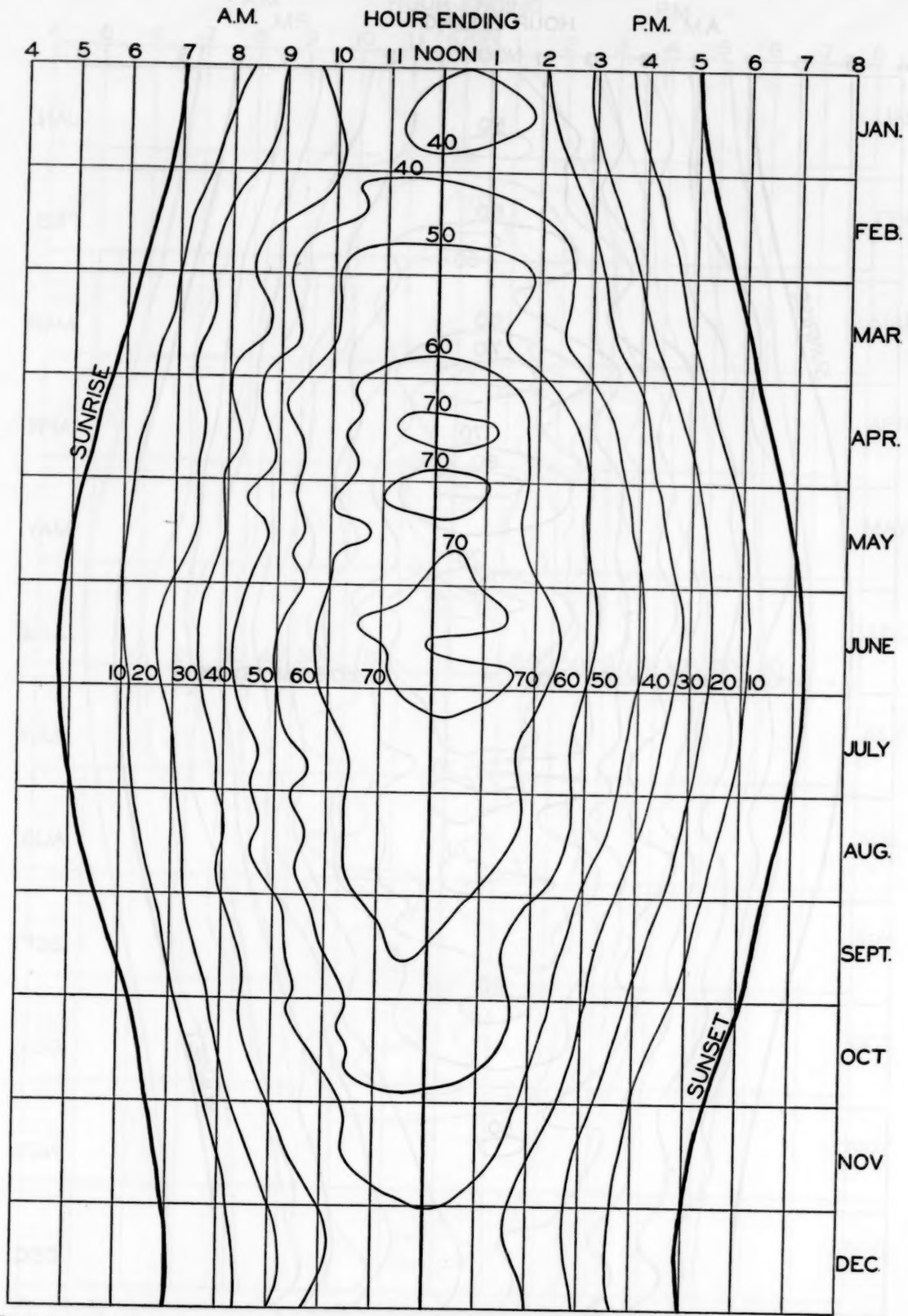

FIGURE 6.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Riverside, throughout the year. See table 6.

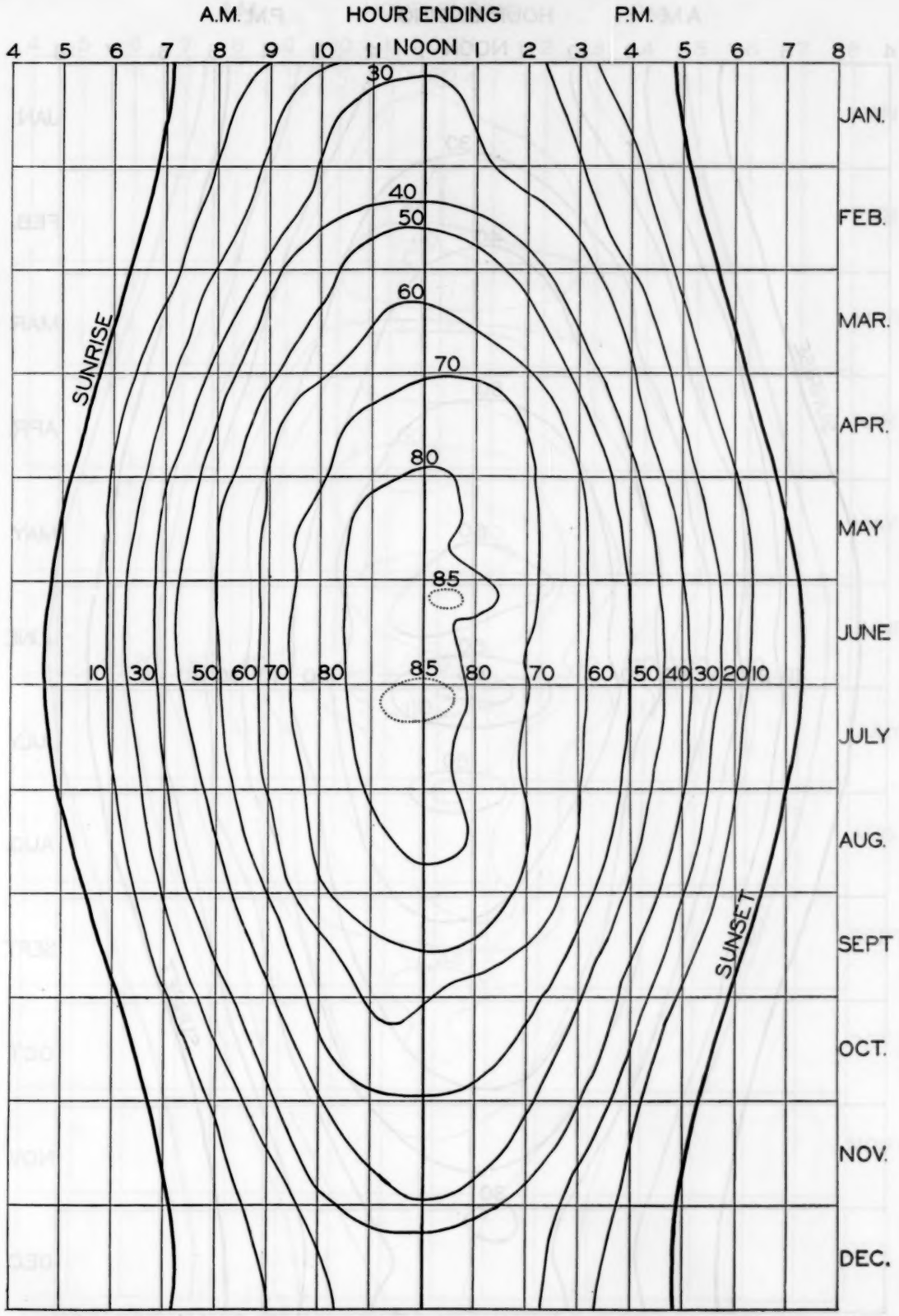

FIGURE 7.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Fresno, throughout the year. See table 7.

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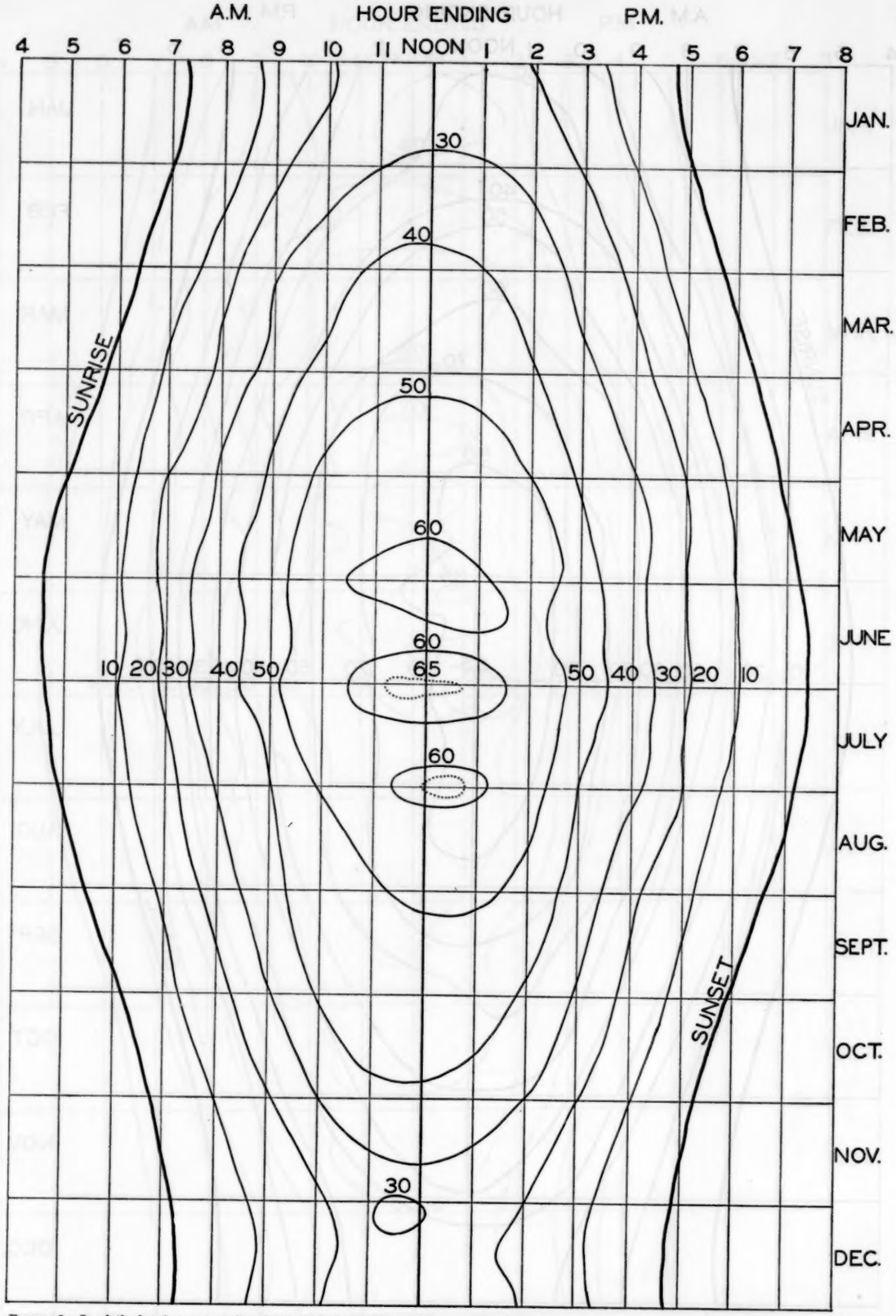

FIGURE 8.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Washington, throughout the year. See table 8.

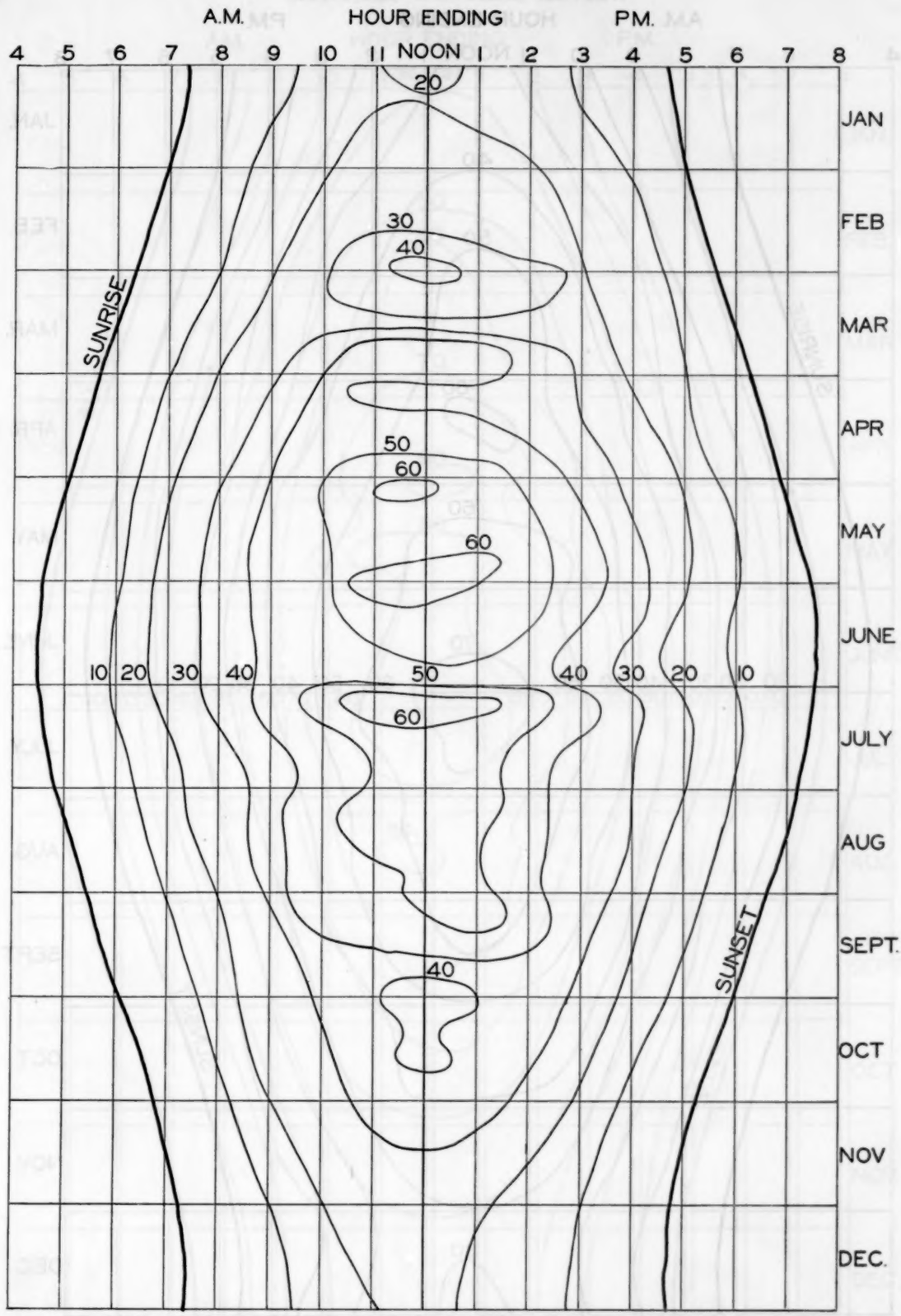

FIGURE 9.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at New York, throughout the year. See table 9.

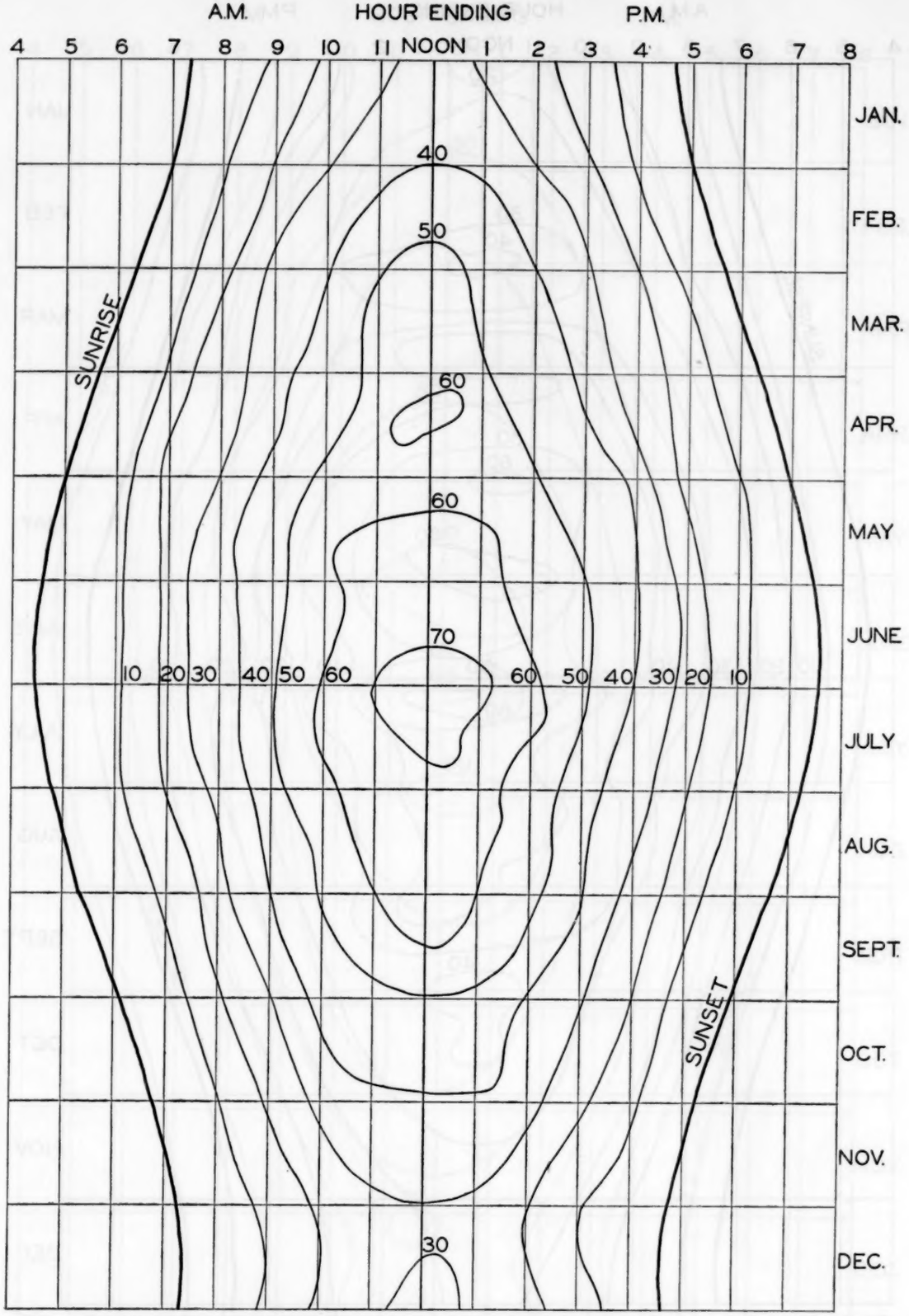

FIGURE 10.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Lincoln, throughout the year. See table 10.

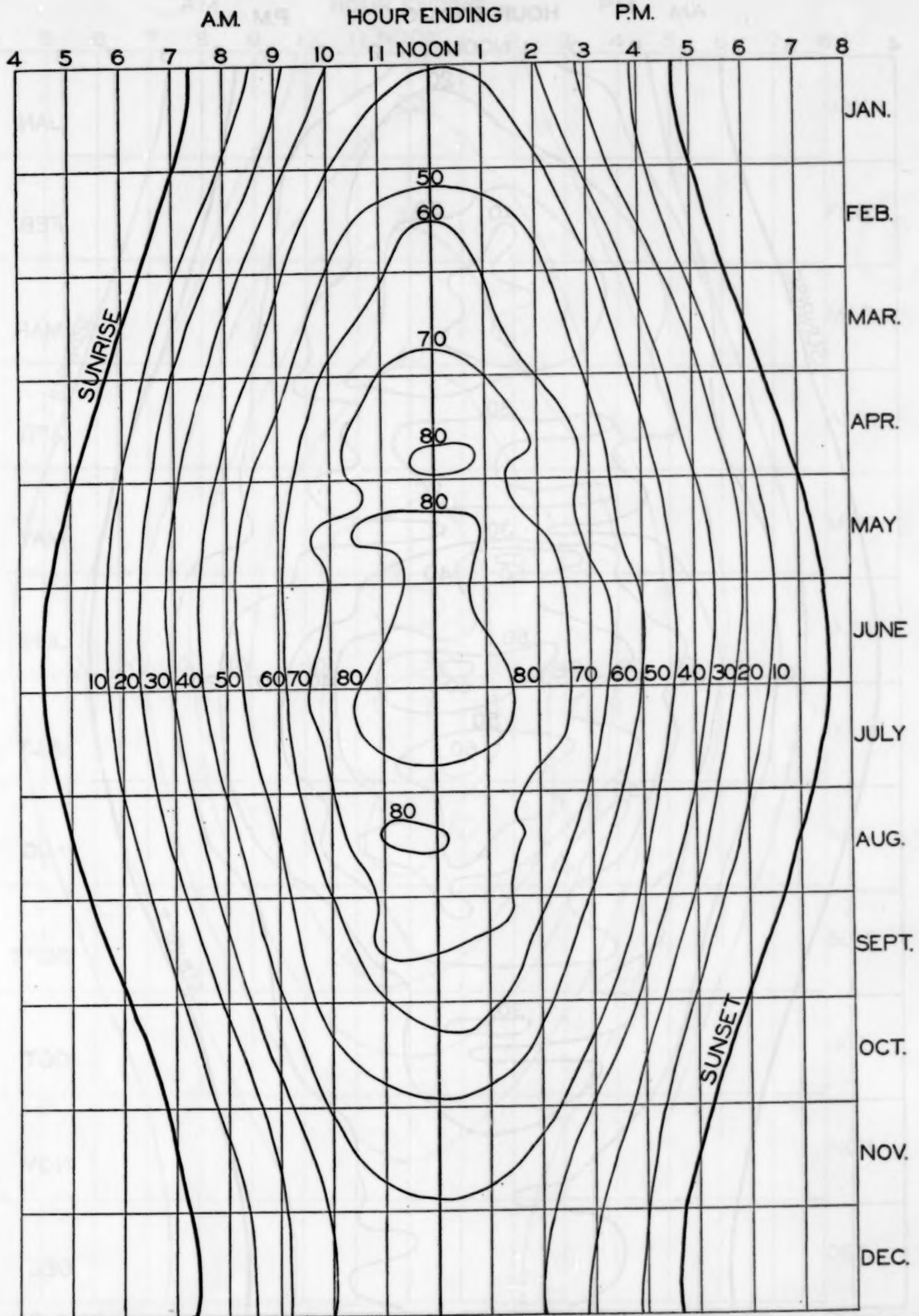

FIGURE 11.—Isopleth showing average maximum hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Lincoln, Nebr., throughout the year. See table 11.

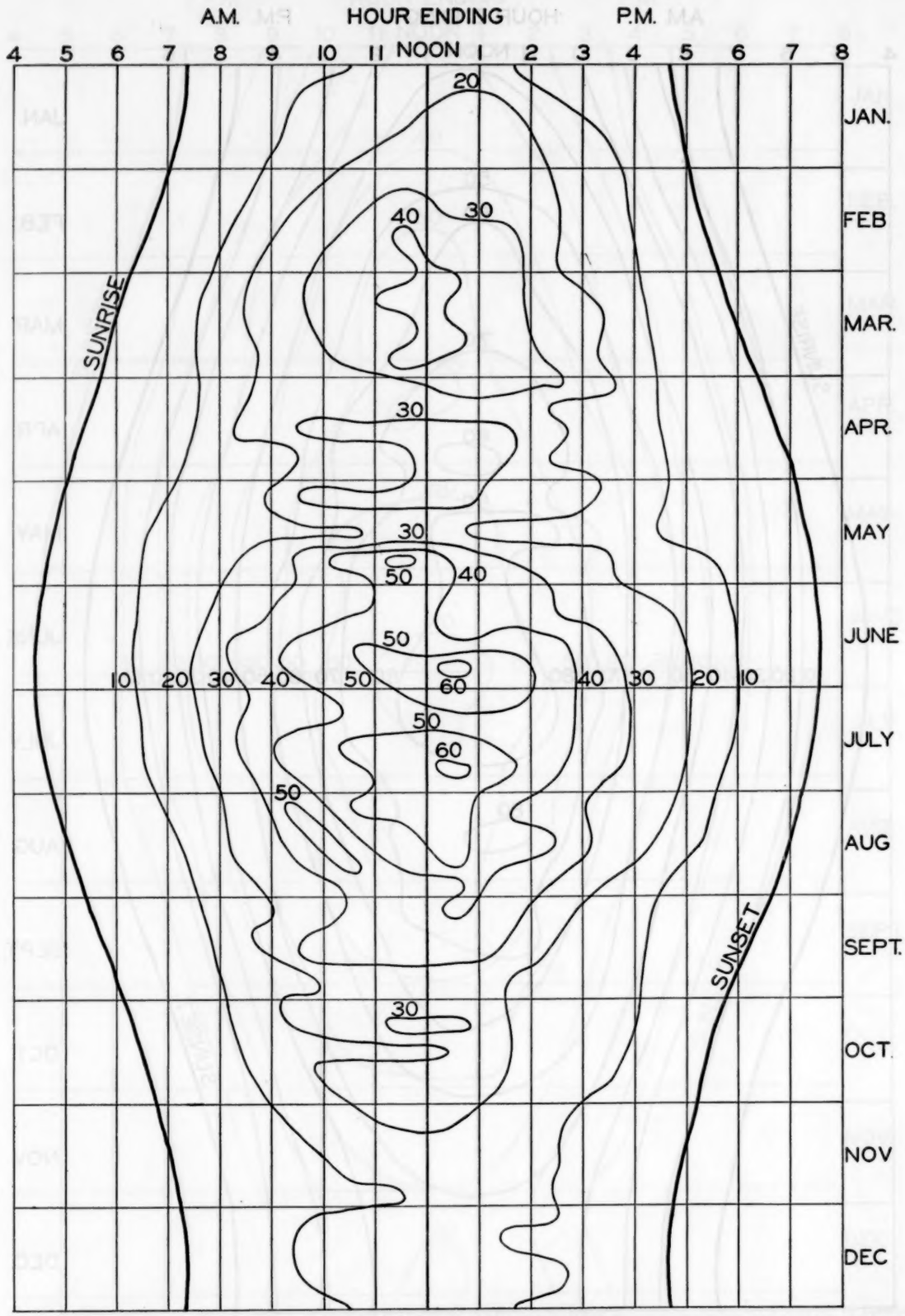

FIGURE 12.—Isopleth showing average minimum hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Lincoln, Nebr., throughout the year. See table 12.

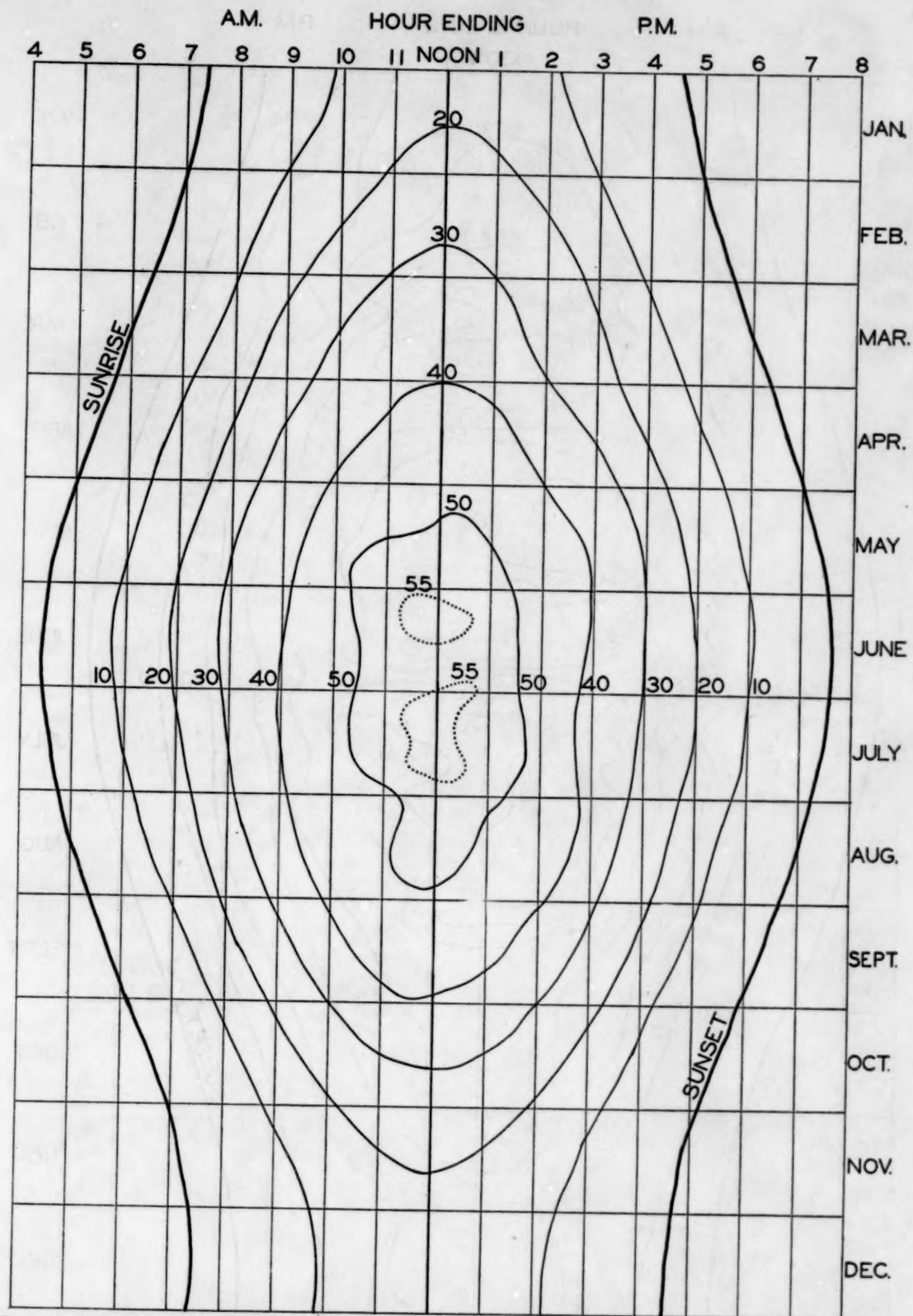

FIGURE 13.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Chicago, Ill., throughout the year. See table 13.

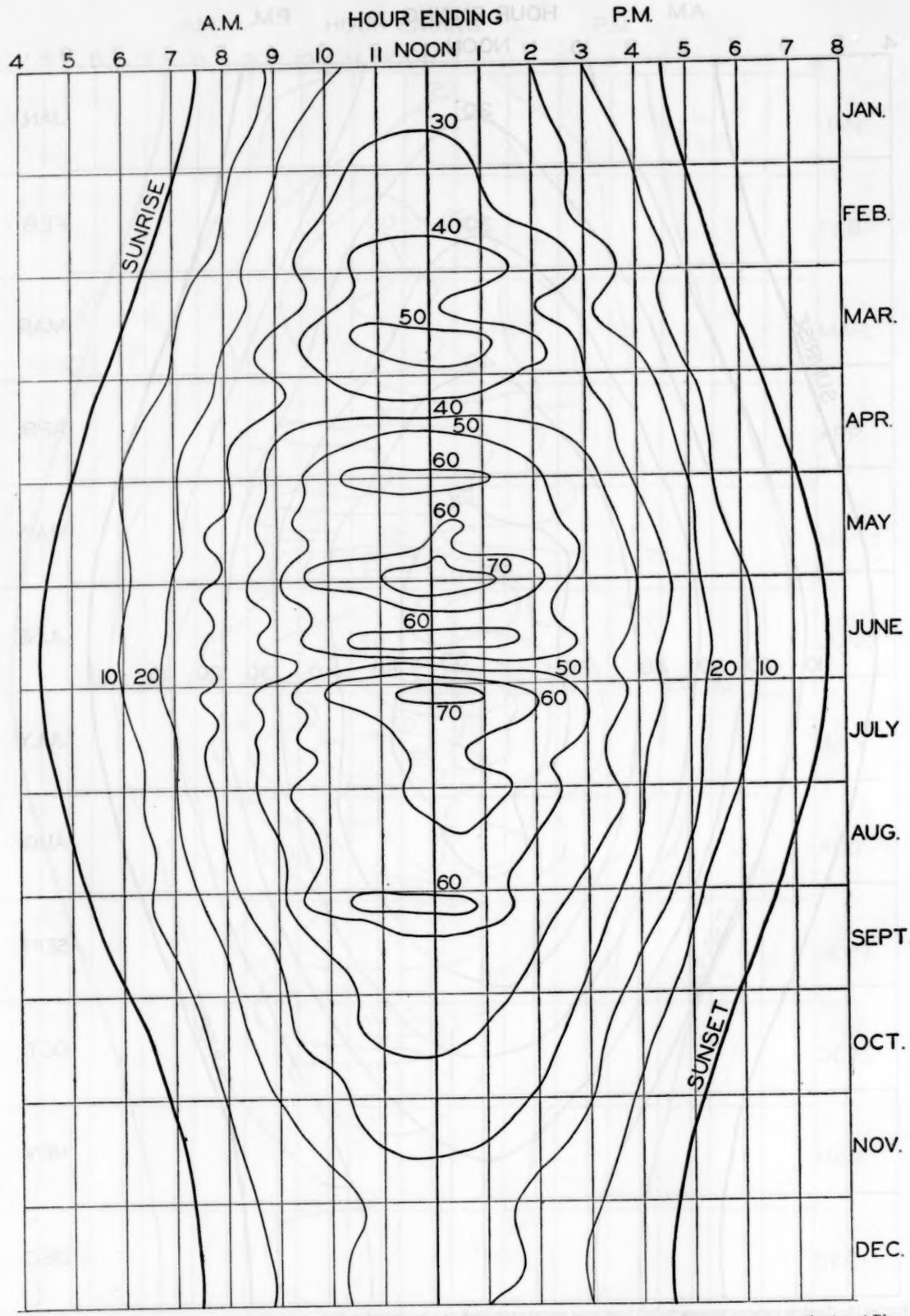

FIGURE 14.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Blue Hill, Mass., throughout the year. See table 14.

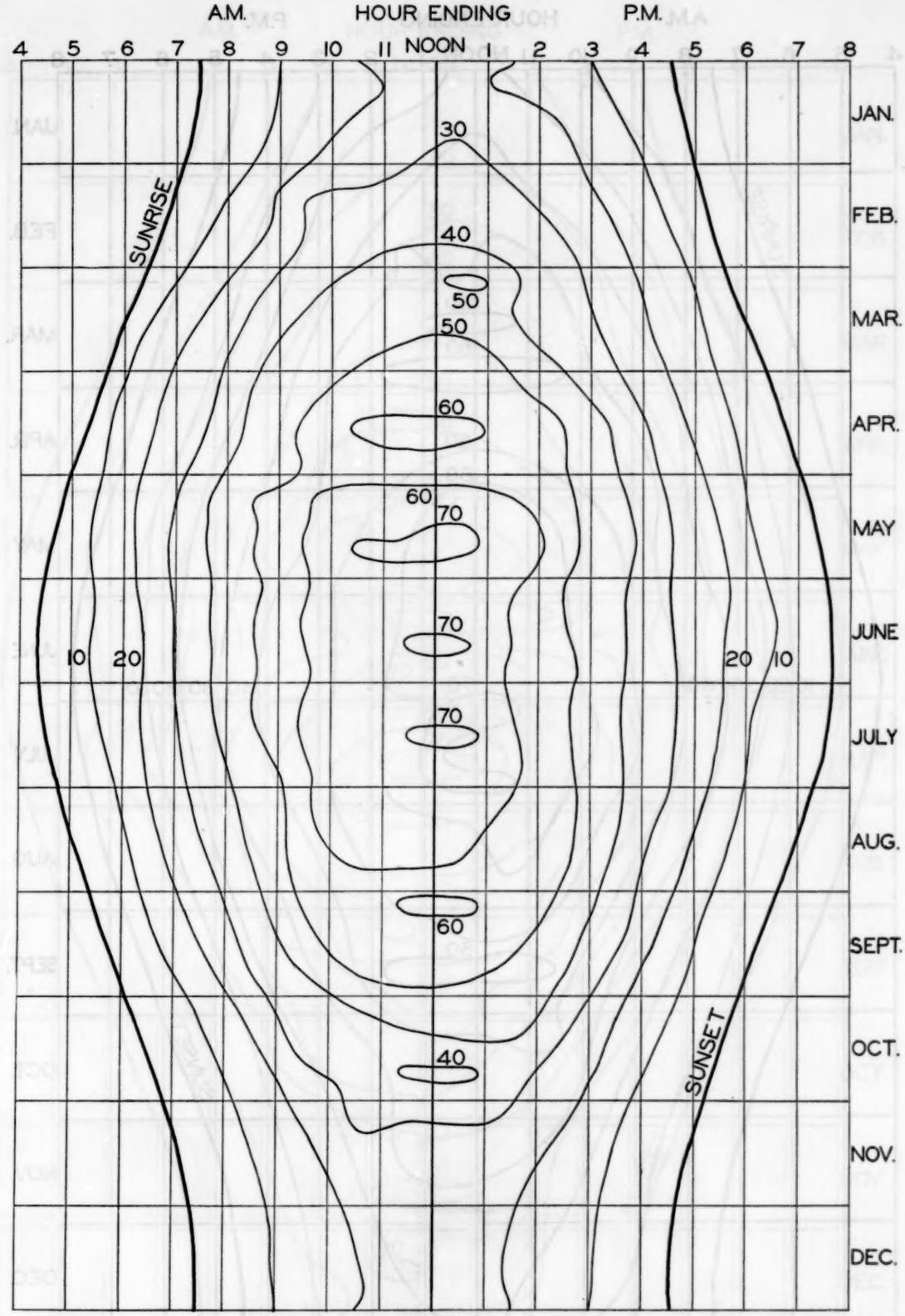

FIGURE 15.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Twin Falls, Idaho, throughout the year. See table 15.

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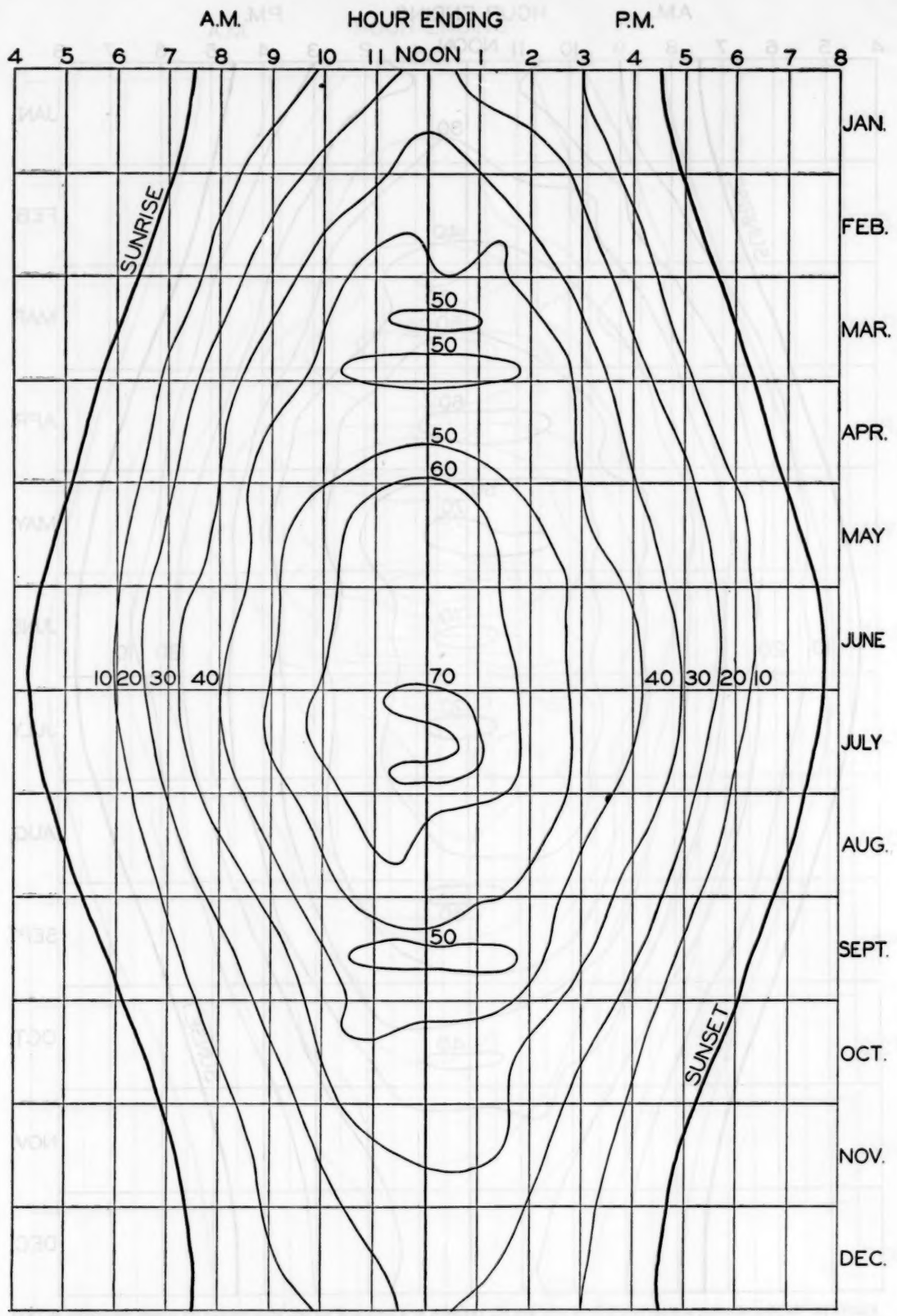


FIGURE 16.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Madison, Wis., throughout the year. See table 16.

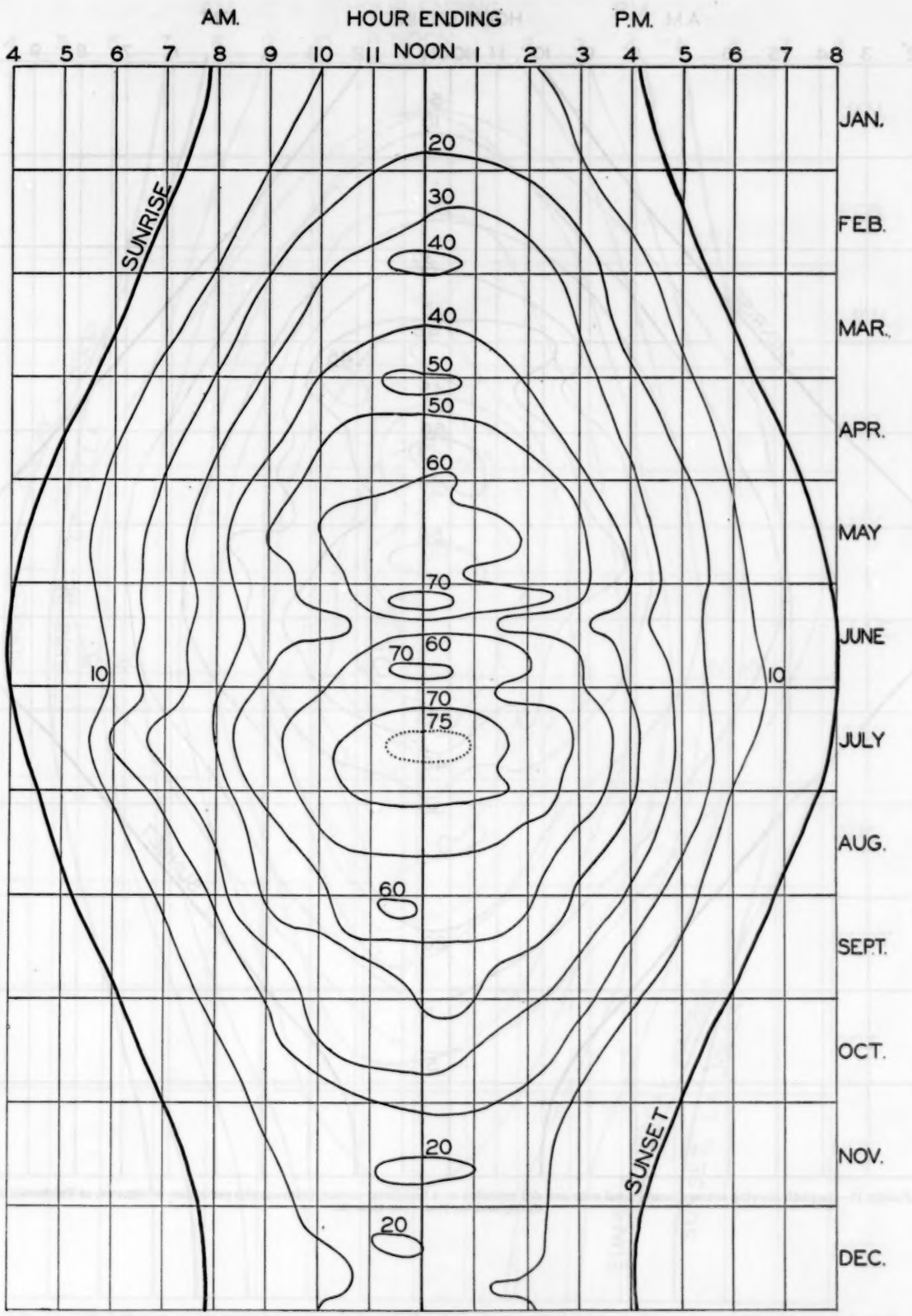


FIGURE 17.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Friday Harbor, Wash., throughout the year. See table 17.

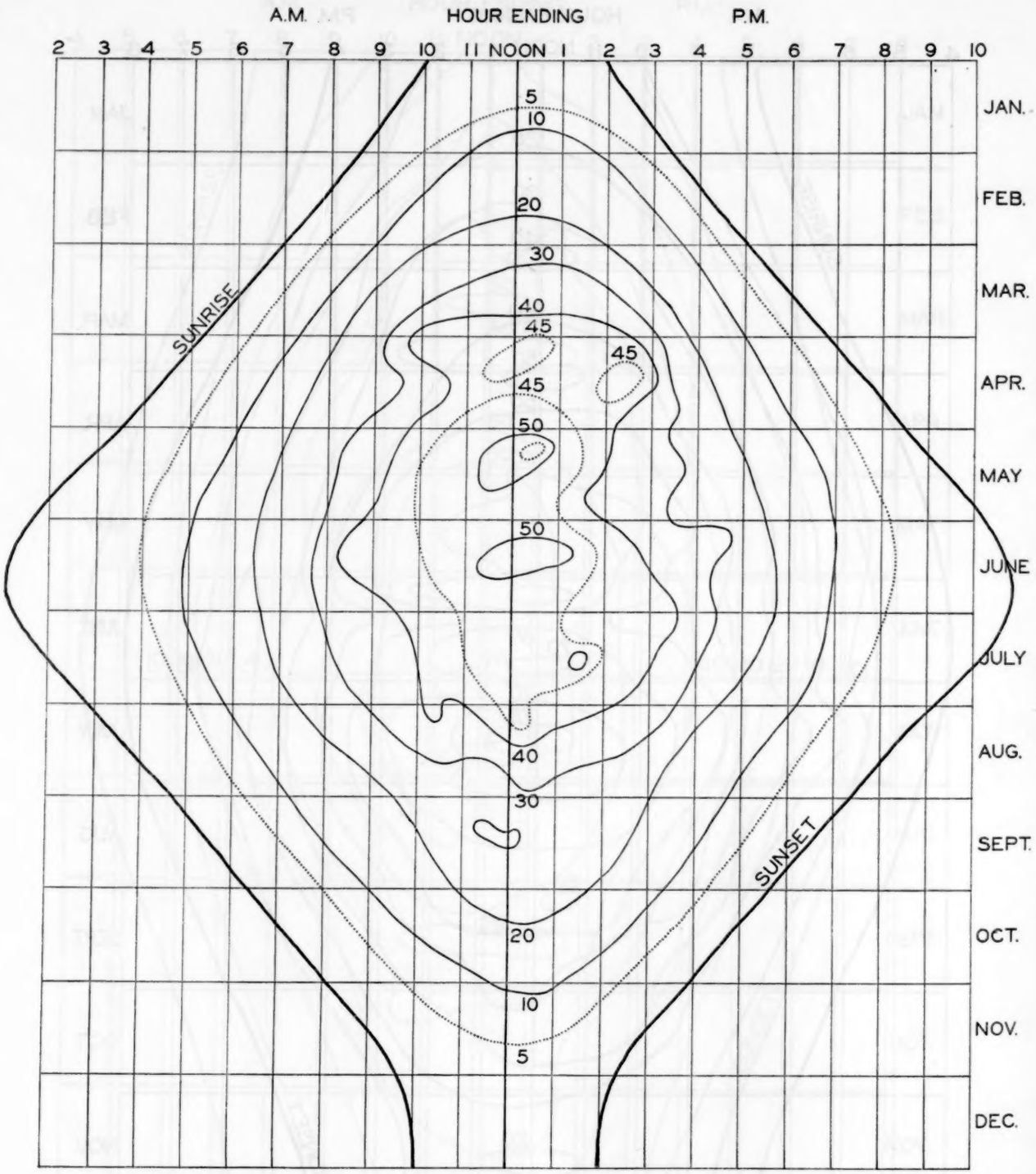


FIGURE 18.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, at Fairbanks, Alaska, throughout the year. See table 18.

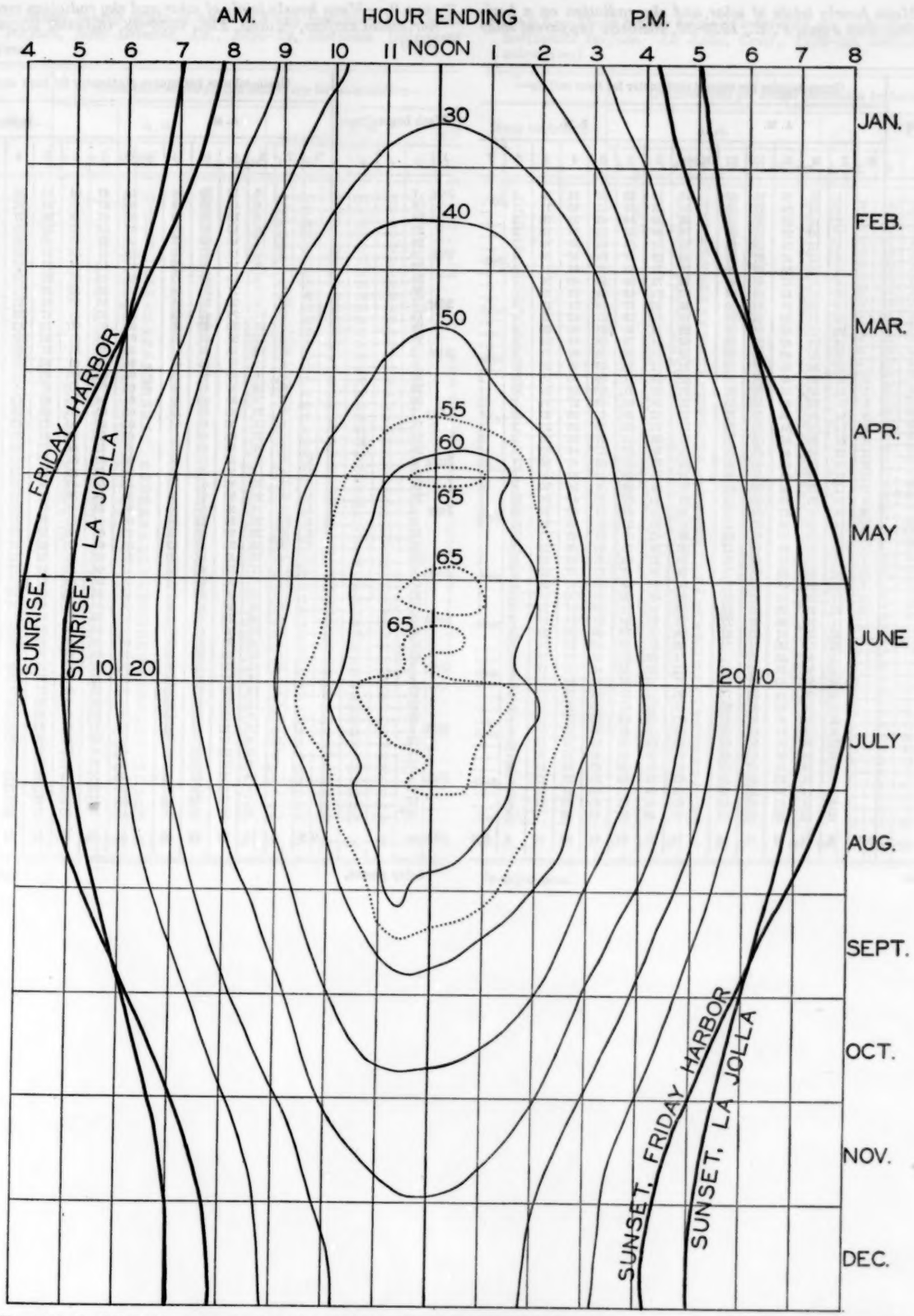


FIGURE 19.—Isopleth showing average hourly total solar and sky radiation on a horizontal surface, gram-calories per square centimeter, composite of 10 stations, throughout the year. See table 19.

TABLE 2.—*Mean hourly totals of solar and sky radiation on a horizontal surface, San Juan, P. R., 1936–38, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—													
	A. M.							P. M.						
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	1	11	26	38	46	49	49	42	28	24	10	1	----
8	----	1	12	28	42	55	58	58	51	41	30	11	1	----
15	----	2	15	28	46	58	63	62	54	43	24	10	2	----
22	----	2	10	26	42	60	76	66	53	49	35	16	2	----
29	----	2	16	38	48	66	75	72	63	49	32	14	2	----
Feb. 5	----	2	12	32	47	58	68	68	67	54	40	20	4	----
12	----	2	15	34	53	66	70	71	70	58	44	24	6	----
19	----	3	12	27	45	60	72	72	66	56	40	24	7	----
26	----	8	27	43	62	84	90	92	83	64	44	22	6	----
Mar. 5	----	6	25	36	44	60	65	56	57	46	34	18	6	----
12	----	9	31	50	58	70	78	82	75	61	42	23	4	----
19	----	10	28	44	66	78	83	74	66	54	40	20	4	----
26	----	6	24	42	62	75	84	84	73	58	44	24	6	----
Apr. 2	----	8	22	40	60	70	75	76	68	58	44	21	8	----
9	----	8	24	43	65	72	71	72	70	68	48	30	10	----
16	1	14	33	55	74	84	82	88	81	66	50	30	10	1
23	1	14	30	55	74	86	92	89	81	66	38	25	10	1
30	1	10	28	43	58	68	73	68	64	43	27	14	6	1
May 7	2	14	31	50	66	72	73	62	58	47	38	23	9	1
14	2	14	32	51	63	72	71	74	68	56	33	23	7	1
21	4	11	30	46	64	70	72	68	55	47	36	20	9	2
28	2	13	30	46	61	73	79	76	67	57	44	25	11	2
June 4	3	16	36	52	65	76	82	73	62	63	42	26	11	2
11	2	13	27	44	57	70	74	70	58	44	33	20	9	1
18	2	12	27	44	59	66	71	64	65	50	36	20	8	1
25	3	15	33	49	64	73	81	80	67	56	42	26	10	1
July 2	2	16	34	37	64	77	79	76	67	57	40	23	10	1
9	2	14	32	48	65	78	77	75	67	53	40	24	10	2
16	1	12	30	50	69	80	87	82	68	57	43	27	11	1
23	1	14	30	49	68	77	80	78	74	64	46	28	11	1
30	1	13	29	49	64	74	78	72	65	53	44	23	8	1
Aug. 6	2	14	33	52	65	76	78	70	67	51	37	22	7	1
13	1	12	28	47	62	75	80	73	63	52	41	21	7	1
20	1	11	29	44	62	68	69	68	58	44	30	18	5	1
27	1	12	29	53	68	84	82	78	71	57	37	22	7	1
Sept. 3	----	11	30	48	62	77	73	70	64	51	34	17	5	----
10	----	10	32	51	67	81	88	83	77	49	34	21	6	----
17	----	10	31	50	61	73	69	65	58	49	33	18	5	----
24	----	9	26	46	63	69	71	69	64	53	34	18	4	----
Oct. 1	----	6	24	43	59	68	72	63	53	44	31	16	3	----
8	----	6	23	39	61	71	77	76	66	52	36	17	4	----
15	----	6	23	44	60	75	80	72	61	46	29	12	2	----
22	----	5	22	39	51	62	73	72	67	50	29	12	2	----
29	----	3	21	40	52	57	60	63	62	46	27	12	1	----
Nov. 5	----	4	18	34	44	58	63	60	51	38	23	10	1	----
12	----	3	16	33	50	62	70	64	59	49	28	12	2	----
19	----	2	16	34	50	61	69	66	56	49	29	10	1	----
26	----	2	13	31	47	57	65	67	60	46	33	14	2	----
Dec. 3	----	2	14	32	48	58	67	74	60	37	29	12	1	----
10	----	2	14	33	50	58	65	64	62	49	27	12	1	----
17	----	2	11	33	48	55	65	64	57	45	26	11	3	----
24*	----	2	13	25	40	54	58	56	53	41	26	9	1	----
Means	0.7	8	24	41	57	69	74	71	64	51	36	19	6	0.5

*8-day means.

TABLE 3.—*Mean hourly totals of solar and sky radiation received on a horizontal surface, Miami, Fla., 1936–38, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—													
	A. M.							P. M.						
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	6	16	30	39	48	47	44	35	25	13	4	----
8	----	----	6	15	28	38	44	47	42	34	24	13	4	----
15	----	----	6	15	29	40	46	48	44	36	27	13	6	----
22	----	----	6	15	30	40	47	48	43	39	28	14	6	----
29	----	----	7	16	30	43	50	51	43	40	29	16	7	----
Feb. 5	----	----	7	15	27	39	48	51	45	37	28	16	8	----
12	----	----	8	16	28	38	44	46	44	31	27	15	8	----
19	----	----	8	18	30	42	44	48	47	39	28	16	8	----
26	----	1	8	21	37	48	55	56	52	48	34	19	8	1
Mar. 5	----	1	9	22	36	48	52	56	50	44	32	20	9	1
12	----	1	11	24	42	49	57	57	54	47	35	23	11	1
19	----	1	12	25	42	50	60	64	60	52	42	26	11	1
26	----	1	12	28	44	54	62	63	61	50	38	24	12	1
Apr. 2	----	4	12	28	44	51	59	63	61	51	40	25	12	3
9	----	4	15	31	52	57	64	64	61	52	38	23	12	4
16	----	5	16	32	46	58	65	65	60	52	42	30	13	5
23	----	6	18	35	49	58	63	64	57	47	40	24	12	6
30	----	7	19	33	48	59	64	64	56	49	42	28	16	6
May 7	----	8	20	36	49	59	62	61	60	48	38	25	16	6
14	----	8	18	30	44	54	62	62	60	52	42	39	15	6
21	----	8	21	36	49	57	62	64	55	44	36	25	13	6
28	----	9	21	36	46	53	51	52	46	42	39	24	13	5
June 4	1	8	21	37	50	56	63	64	61	52	44	30	17	7
11	1	8	15	30	40	48	56	53	52	44	33	27	14	8
18	1	9	20	33	42	52	56	54	47	38	27	21	12	8
25	1	8	20	35	44	50	54	48	39	32	27	18	12	8
July 2	1	9	18	29	40	50	54	53	46	41	32	23	13	8
9	1	10	20	34	46	54	60	54	51	46	37	25	14	8
16	1	9	22	36	46	53	62	63	60	53	39	28	16	8
23	1	8	18	32	46	52	62	64	60	49	36	28	16	8
30	----	9	18	31	44	50	54	60	51	44	32	23	13	7
Aug. 6	----	7	17	30	40	45	52	56	53	46	37	27	16	7
13	----	7	17	32	49	54	61	60	52	47	38	24	13	6
20	----	7	15	27	42	51	53	53	50	42	32	20	11	5
27	----	6	16	26	37	55	60	56	46	35	26	15	9	3
Sept. 3	----	6	16	32	43	51	57	59	51	39	31	18	9	4
10	----	5	18	27	43	46	51	53	50	39	31	19	9	3
17	----	5	16	31	46	58	60	56	48	42	39	17	7	2
24	----	5	13	24	35	42	43	43	38	33	23	14	7	2
Oct. 1	----	3	13	26	40	50	54	57	53	43	29	16	8	----
8	----	4	12	27	38	46	51	52	46	37	26	13	5	----
15	----	4	12	28	42	50	56	55	48	37	26	13	4	----
22	----	4	13	28	42	50	55	56	48	36	25	12	4	----
29	----	3	10	23	36	44	49	50	41	33	22	10	3	----
Nov. 5	----	2	10	22	34	44	50	49	43	32	22	10	2	----
12	----	2	9	18	31	40	46	46	40	29	20	9	2	----
19	----	2	9	22	34	43	45	48	39	31	20	8	2	----
26	----	1	8	20	30	41	45	48	42	33	21	10	2	----
Dec. 3	----	----	8	20	32	44	48	50	44	33	22	10	2	----
10	----	----	8	16	27	38	44	46	43	32	22	10	2	----
17	----	----	7	16	30	42	46	46	43	33	23	11	2	----
24*	----	----	6	15	28	38	44	47	40	33	23	11	3	----
Means	0.2	4	13	26	39	48	54	55	49	41	31	19	9	3

*8-day means.

TABLE 4.—*Mean hourly totals of solar and sky radiation on a horizontal surface, New Orleans, La., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	4	12	21	30	34	32	25	19	12	5	1	----
8	----	----	2	9	18	24	33	34	32	26	16	7	4	----
15	----	----	3	10	21	32	37	38	34	28	16	6	1	----
22	----	----	3	11	22	28	33	36	34	25	15	7	2	----
29	----	----	2	9	20	29	34	33	33	28	19	8	2	----
Feb. 5	----	----	3	11	21	31	38	37	36	28	19	10	3	----
12	----	1	7	18	32	45	50	52	48	39	34	15	4	----
19	----	1	8	18	32	44	47	50	47	40	28	15	5	----
26	----	2	8	20	32	42	51	52	49	39	28	16	5	----
Mar. 5	----	1	8	20	34	46	53	56	54	48	30	15	6	----
12	----	2	12	25	38	52	57	58	54	46	39	17	6	----
19	----	2	10	24	38	49	55	58	52	41	28	16	5	----
26	----	2	12	24	37	47	50	55	48	40	28	14	5	----
Apr. 2	----	2	11	25	37	49	57	58	54	46	36	21	9	2
9	----	4	18	34	49	59	65	64	62	53	40	24	10	2
16	1	4	18	35	48	58	66	68	67	54	40	25	10	2
23	1	3	13	27	41	51	52	67	56	47	37	24	12	2
30	1	5	18	34	46	56	63	64	60	54	50	28	12	3
May 7	2	7	20	36	48	61	64	62	58	48	38	25	11	3
14	1	6	23	34	47	57	62	55	56	50	38	25	12	4
21	1	6	19	33	44	56	61	63	53	47	42	31	16	4
28	2	8	18	37	49	57	56	61	61	53	42	26	12	3
June 4	3	12	26	39	48	58	62	57	58	48	36	22	11	5
11	2	12	28	43	56	65	71	70	59	48	37	28	15	6
18	2	12	27	40	52	62	63	62	61	56	47	34	17	7
25	3	13	24	38	48	54	65	62	57	49	38	29	16	6
July 2	4	12	25	36	48	50	60	61	56	47	31	21	13	4
9	2	10	23	36	38	58	56	52	45	35	30	24	12	5
16	2	10	23	39	52	59	66	62	46	45	28	22	14	5
23	2	12	28	44	52	53	54	56	50	36	30	22	13	6
30	2	10	25	38	42	47	52	48	47	42	29	20	10	4
Aug. 6	1	6	19	35	45	52	55	59	52	45	32	24	13	5
13	1	6	19	31	42	49	53	51	40	38	30	22	14	5
20	2	8	23	38	52	58	57	52	44	42	32	20	10	4
27	1	6	18	33	47	56	54	55	53	44	31	20	10	3
Sept. 3	----	3	16	33	41	47	47	45	39	35	26	15	7	2
10	----	3	13	27	39	45	52	47	42	35	28	14	7	2
17	----	7	20	33	43	52	57	55	55	44	31	17	6	2
24	----	3	14	29	43	52	55	55	51	38	23	15	5	1
Oct. 1	----	1	9	21	34	45	48	48	48	40	28	15	5	----
8	----	2	10	25	38	48	50	51	44	36	25	11	3	----
15	----	2	10	24	36	43	49	49	42	35	23	10	2	----
22	----	2	12	29	43	53	56	56	50	38	21	7	2	----
29	----	1	7	21	36	47	53	53	49	39	25	12	3	----
Nov. 5	----	----	8	19	34	45	48	47	41	30	16	5	1	----
12	----	----	6	16	27	32	33	36	31	23	12	4	----	----
19	----	----	6	19	30	39	44	44	36	27	12	4	----	----
26	----	----	4	13	24	32	36	36	31	23	12	3	----	----
Dec. 3	----	----	4	12	23	30	37	36	31	21	12	2	----	----
10	----	----	5	14	24	33	38	37	33	24	13	3	----	----
17	----	----	3	11	22	33	44	44	33	24	14	4	----	----
24*	----	----	2	8	17	26	31	31	28	20	12	4	----	----
Means	1	4	13	26	38	47	51	51	47	39	28	16	7	2

*8-day means.

TABLE 5.—*Mean hourly totals of solar and sky radiation received on a horizontal surface. La Jolla, Calif., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	3	14	27	34	40	40	39	28	17	4	----	----
8	----	----	4	16	30	40	45	45	40	30	16	4	----	----
15	----	----	5	17	27	38	42	48	36	28	16	4	----	----
22	----	----	6	20	34	45	51	50	44	32	20	6	----	----
29	----	----	5	16	28	38	44	44	41	30	20	8	----	----
Feb. 5	----	----	6	15	32	40	47	48	43	30	20	8	----	----
12	----	----	6	17	29	38	44	46	42	32	21	9	----	----
19	----	1	8	23	38	50	59	60	56	48	30	14	2	----
26	----	2	13	29	41	52	59	59	52	45	30	14	3	----
Mar. 5	----	2	13	26	41	48	50	54	53	43	29	14	2	----
12	----	2	11	23	32	44	58	58	54	43	30	16	4	----
19	----	3	12	26	40	53	61	63	58	50	34	19	6	----
26	----	8	23	39	50	62	71	70	64	52	45	19	4	----
Apr. 2	1	9	24	41	56	64	73	76	66	51	36	21	6	----
9	1	7	16	29	43	54	63	66	59	50	36	19	5	----
16	1	8	19	31	43	56	65	67	61	50	45	20	7	1
23	2	9	23	34	44	66	73	77	67	53	36	20	7	1
30	3	14	25	44	58	74	82	85	71	58	45	26	14	2
May 7	3	12	23	40	54	72	78	76	71	58	43	27	12	2
14	4	12	21	37	54	66	70	70	63	50	39	22	8	1
21	3	11	22	35	48	58	64	64	61	49	38	24	10	2
28	3	10	22	38	56	67	70	71	62	54	38	24	10	2
June 4	4	12	26	41	58	73	80	79	74	62	46	30	19	3
11	4	11	23	47	58	72	76	76	70	59	44	26	12	2
18	3	9	20	38	51	68	79	78	71	58	44	39	13	3
25	3	9	21	39	55	66	75	78	71	60	44	28	12	2
July 2	2	9	20	38	54	67	74	75	68	57	42	26	12	2
9	3	10	26	42	57	68	71	73	66	56	40	23	9	1
16	3	10	22	39	57	69	75	74	64	57	42	26	11	2
23	2	8	21	35	47	58	56	62	59	50	36	21	10	3
30	2	10	20	35	52	65	72	72	65	54	40	26	11	2
Aug. 6	1	5	14	29	45	56	68	72	68	57	47	25	10	1
13	1	5	14	29	45	60	66	68	63	53	48	22	8	1
20	2	10	24	41	58	66	69	71	64	53	38	21	6	1
27	2	8	20	42	59	70	71	71	65	54	35	19	5	2
Sept. 3	1	8	21	38	54	63	68	66	58	48	34	18	5	2
10	1	8	22	38	48	59	65	65	62	47	32	15	2	----
17	1	8	21	34	51	60	62	57	50	37	22	9	1	----
24	1	7	17	30	40	51	54	53	46	36	22	8	1	----
Oct. 1	----	6	18	38	48	58	62	59	52	40	25	10	1	----
8	----	5	20	36	48	56	59	56	50	46	22	7	1	----
15	----	5	17	30	42	52	56	54	46	31	15	4	----	----
22	----	2	14	26	34	42	46	45	48	30	16	4	----	----
29	----	2	12	24	35	47	52	50	43	30	17	4	----	----
Nov. 5	----	2	8	19	32	38	42	42	38	29	20	6	----	----
12	----	2	14	28	41	47	50	47	38	26	12	1	----	----
19	----	1	12	25	38	44	48	44	36	25	10	2	----	----
26	----	1	10	23	34	43	45	43	34	22	9	1	----	----
Dec. 3	----	1	8	20	31	41	45	41	34	26	11	2	----	----
10	----	----	6	17	27	33	38	36	30	21	10	1	----	----
17	----	----	8	20	31	38	42	38	33	22	9	1	----	----
24*	----	----	7	20	32	38	43	39	34	21	10	2	----	----
Means	1	5	16	30	44	54	60	60	54	43	29	15	5	1

*8-day means.

TABLE 6.—*Mean hourly totals of solar and sky radiation on a horizontal surface. Riverside, Calif., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	2	12	28	36	38	40	35	25	14	3	----	----
8	----	----	2	14	27	36	40	40	39	26	15	3	----	----
15	----	----	3	15	27	36	40	41	37	28	15	4	----	----
22	----	----	6	19	33	40	44	42	36	26	15	4	----	----
29	----	----	6	15	27	34	35	36	37	27	16	5	----	----
Feb. 5	----	----	8	22	28	42	46	45	38	30	19	6	----	----
12	----	----	8	20	31	39	42	44	41	31	19	7	----	----
19	----	1	12	27	39	48	48	48	44	36	22	9	1	----
26	----	2	15	30	41	53	58	58	52	40	27	12	2	----
Mar. 5	----	2	15	30	44	54	63	60	53	41	28	12	2	----
12	----	4	16	27	43	52	59	58	52	43	30	14	2	----
19	----	4	16	27	38	48	54	52	47	38	26	14	4	----
26	----	6	22	34	47	55	60	61	53	44	30	16	5	----
Apr. 2	----	9	25	38	52	62	68	66	62	50	35	21	7	----
9	----	8	22	35	50	58	70	68	63	45	36	21	7	----
16	1	10	22	36	50	63	74	75	68	57	41	24	9	1
23	1	9	20	30	46	58	64	64	62	54	40	25	10	1
30	2	11	24	35	50	64	74	74	68	57	42	28	12	2
May 7	2	13	26	42	54	66	74	72	67	57	44	29	12	2
14	2	9	19	33	45	55	63	66	62	53	41	26	12	2
21	3	12	25	39	55	64	68	70	64	56	41	28	14	3
28	2	11	22	36	49	60	64	71	65	58	45	30	14	3
June 4	2	13	26	40	53	66	72	74	66	59	47	32	16	4
11	3	15	29	45	58	70	76	75	70	61	49	33	16	4
18	3	20	29	44	58	66	72	66	68	60	47	33	16	4
25	3	15	27	43	59	69	74	75	72	60	48	34	17	4
July 2	2	14	27	45	54	66	72	72	68	59	47	32	16	4
9	3	16	30	46	56	63	66	69	66	58	47	32	16	4
16	2	13	25	39	53	61	65	64	60	52	41	27	14	3
23	2	12	25	39	48	60	64	66	60	55	42	26	13	2
30	2	13	27	40	52	62	68	67	62	52	41	28	13	2
Aug. 6	2	10	22	37	52	60	66	68	60	53	42	26	12	2
13	2	10	23	38	48	60	68	68	61	52	40	25	10	2
20	1	12	27	42	54	61	66	67	60	52	38	28	10	1
27	1	10	25	38	50	60	67	64	57	48	37	22	7	1
Sept. 3	----	8	21	34	46	56	65	62	56	46	34	20	6	----
10	----	7	20	35	48	58	61	58	52	43	29	15	4	----
17	----	4	20	36	46	53	61	54	47	38	28	14	4	----
24	----	4	17	30	42	50	55	55	50	40	27	14	4	----
Oct. 1	----	3	16	30	40	50	54	54	50	40	28	13	2	----
8	----	2	18	34	44	54	56	56	50	38	26	11	1	----
15	----	2	12	30	36	47	53	53	50	35	24	8	1	----
22	----	1	13	29	39	50	55	55	46	36	24	9	1	----
29	----	----	8	22	34	42	48	46	41	32	20	7	----	----
Nov. 5	----	----	6	20	30	39	44	45	41	30	18	6	----	----
12	----	----	7	22	34	44	48	48	40	29	17	5	----	----
19	----	----	4	20	31	40	45	44	39	28	16	4	----	----
26	----	----	2	16	28	38	42	44	38	28	16	3	----	----
Dec. 3	----	----	2	15	26	34	39	39	34	24	13	3	----	----
10	----	----	2	12	22	32	34	36	30	22	12	2	----	----
17	----	----	2	14	26	33	38	38	33	24	12	2	----	----
24*	----	----	2	14	26	34	37	37	32	24	13	3	----	----
Means	1	6	16	30	42	52	57	57	52	42	30	16	6	1

* 8-day means.

TABLE 7.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Fresno, Calif., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	1	7	14	21	28	29	26	19	9	1	----	----
8	----	----	1	9	20	28	30	31	32	24	14	3	----	----
15	----	----	2	14	24	34	38	38	34	27	13	3	----	----
22	----	----	2	13	23	33	38	38	32	26	16	4	----	----
29	----	----	3	14	23	30	29	31	24	20	12	4	----	----
Feb. 5	----	----	5	14	27	36	41	39	32	28	16	6	----	----
12	----	----	6	18	28	36	38	35	35	30	19	7	----	----
19	----	----	9	24	38	46	52	52	48	39	26	10	----	----
26	----	2	14	28	44	54	59	57	53	42	28	13	2	----
Mar. 5	----	2	13	29	44	53	59	56	52	40	30	13	2	----
12	----	3	18	35	49	56	62	60	54	46	31	16	3	----
19	----	4	16	31	44	53	58	61	54	45	33	17	4	----
26	----	6	20	37	50	59	65	65	61	52	39	22	6	----
Apr. 2	----	8	26	44	57	63	68	70	65	54	40	23	8	----
9	1	11	28	45	60	69	74	77	71	61	46	27	10	1
16	1	13	32	49	63	72	76	76	72	61	45	29	13	1
23	2	14	31	49	64	70	76	78	73	59	44	28	12	1
30	2	16	34	52	66	75	80	82	76	66	57	34	16	2
May 7	3	19	38	55	69	79	82	81	74	64	52	34	17	3
14	4	20	38	55	70	80	84	82	78	68	54	37	19	4
21	6	22	40	56	69	77	81	78	77	68	56	38	20	5
28	6	21	39	54	67	76	82	83	77	69	57	39	21	5
June 4	6	22	40	57	70	80	84	85	81	68	54	39	21	6
11	7	22	40	58	70	77	81	80	76	68	53	37	22	6
18	8	24	43	59	72	80	84	84	78	68	56	40	23	7
25	7	24	41	56	70	79	84	83	77	69	56	40	23	7
July 2	7	24	43	59	72	81	86	86	79	69	57	41	22	7
9	7	22	41	58	70	79	86	84	79	67	54	40	21	6
16	6	22	39	56	70	79	84	82	78	69	56	40	21	6
23	4	19	36	51	65	76	81	80	74	65	53	37	19	4
30	4	19	38	56	69	78	83	84	77	66	54	37	18	4
Aug. 6	3	18	35	51	66	76	82	82	76	68	52	35	17	2
13	2	16	34	52	66	76	81	82	76	67	52	35	16	2
20	1	14	31	49	65	74	80	80	76	65	52	32	14	1
27	1	12	31	48	63	72	79	79	74	64	49	31	12	1
Sept. 3	----	10	38	47	62	72	77	76	72	62	46	28	10	----
10	----	8	23	40	55	68	72	73	66	57	42	23	6	----
17	----	6	22	39	54	64	69	70	63	53	37	19	4	----
24	----	3	17	32	46	58	64	61	55	46	32	17	3	----
Oct. 1	----	2	14	30	45	54	62	58	54	45	30	15	2	----
8	----	2	14	30	44	54	60	71	56	45	30	14	2	----
15	----	1	11	27	39	52	56	56	48	38	25	10	1	----
22	----	----	9	25	39	50	55	55	50	40	25	9	----	----
29	----	----	7	22	34	45	48	48	40	35	22	7	----	----
Nov. 5	----	----	5	19	32	44	49	48	44	39	20	6	----	----
12	----	----	4	18	30	41	46	46	41	30	17	4	----	----
19	----	----	4	16	27	37	43	42	37	28	15	3	----	----
26	----	----	2	12	23	34	40	40	36	27	15	2	----	----
Dec. 3	----	----	1	10	18	26	30	30	27	21	10	2	----	----
10	----	----	1	7	16	26	27	27	24	18	10	2	----	----
17	----	----	----	5	10	20	25	24	24	16	8	----	----	----
24*	----	----	1	7	16	27	27	28	27	19	10	1	----	----
Means	2	9	21	35	48	57	62	62	57	48	35	20	8	2

*8-day means.

TABLE 8.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Washington, D. C., 1927–39, inclusive (apparent solar time)*

Week beginning—	Gram calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	1.6	8.0	18.0	22.7	26.7	26.3	23.3	17.1	8.6	1.8	----	----	----
8	----	----	----	1.5	7.2	15.2	20.9	24.6	24.5	21.9	16.1	8.4	1.7	----	----	----
15	----	----	----	1.8	7.7	15.1	19.6	24.2	24.8	21.9	16.3	8.6	2.7	----	----	----
22	----	----	----	2.4	9.2	17.3	23.4	26.7	28.9	26.5	20.2	11.7	3.0	----	----	----
29	----	----	----	3.3	11.8	24.3	29.7	34.4	33.5	28.2	23.7	13.9	4.0	----	----	----
Feb. 5	----	----	0.3	3.9	12.8	22.8	29.6	35.1	35.3	31.2	24.6	14.6	4.7	0.3	----	----
12	----	----	0.4	4.8	14.1	24.1	30.8	34.6	34.4	30.3	24.4	14.7	6.1	0.5	----	----
19	----	----	0.7	6.7	17.8	28.0	35.2	39.6	39.6	34.4	26.9	17.4	7.6	0.7	----	----
26	----	----	1.2	9.2	20.0	30.5	37.5	41.0	40.5	37.7	29.6	20.6	9.9	1.2	----	----
Mar. 5	----	----	1.9	11.4	22.7	33.3	40.7	45.0	45.4	41.4	33.0	23.1	16.1	2.0	----	----
12	----	----	1.3	11.5	22.7	33.0	40.1	42.5	41.3	37.5	31.7	22.7	12.2	1.8	----	----
19	----	0.1	3.2	13.4	22.9	32.4	41.2	43.6	43.9	40.2	32.9	23.9	18.3	3.8	0.1	----
26	----	0.2	4.2	14.8	25.6	34.5	40.3	44.3	42.8	41.3	34.3	25.6	15.7	5.4	0.3	----
Apr. 2	----	0.4	5.6	15.9	26.0	35.2	41.4	44.8	46.1	43.4	35.7	27.2	16.1	6.0	0.5	----
9	----	0.8	7.8	19.1	31.1	40.9	47.9	51.0	51.4	45.8	37.8	28.1	17.0	6.9	0.6	----
16	----	1.3	9.0	20.1	32.2	44.0	52.3	52.1	51.9	46.7	41.2	31.7	21.7	9.3	1.3	----
23	----	1.7	10.7	23.7	36.7	45.9	53.7	58.5	57.1	51.2	45.7	36.8	24.5	11.5	2.1	----
30	----	2.7	11.8	24.3	37.3	49.0	57.3	60.8	60.5	57.0	48.8	36.5	24.9	12.9	2.9	----
May 7	----	2.8	10.5	22.1	32.1	41.9	50.1	55.8	56.5	53.6	46.8	35.8	24.4	12.6	2.9	----
14	0.1	3.6	12.3	25.4	37.4	46.7	53.4	57.1	55.8	52.3	47.2	36.2	25.4	12.8	3.8	0.1
21	0.2	4.2	14.4	27.5	40.4	52.7	59.1	61.9	63.1	59.3	50.7	39.5	27.0	14.5	4.2	0.2
28	0.3	5.2	16.3	30.9	43.8	53.3	61.2	63.6	62.5	57.4	50.4	39.8	27.8	16.0	5.4	0.3
June 4	0.5	5.6	16.2	30.1	41.5	53.0	59.0	61.8	61.7	58.3	51.0	40.2	28.0	15.5	5.5	0.5
11	0.5	5.2	14.8	28.8	39.4	50.9	58.3	59.4	61.3	60.8	52.2	43.3	27.8	15.3	5.5	0.5
18	0.5	5.3	15.9	28.0	39.8	49.9	55.6	59.3	59.3	54.7	47.3	38.9	28.8	16.0	5.7	0.6
25	0.6	6.1	16.6	30.6	42.2	53.3	60.3	64.6	64.2	58.8	51.4	40.1	28.3	15.5	5.7	0.6
July 2	0.5	5.7	17.2	31.1	43.2	53.5	60.8	65.6	65.0	62.6	55.4	41.5	30.3	17.5	6.4	0.5
9	0.4	5.3	14.7	26.1	39.0	50.3	57.4	63.0	62.9	59.5	50.1	39.0	27.3	15.1	5.3	0.5
16	0.3	5.3	14.5	26.7	36.7	48.1	54.5	57.3	58.0	52.7	48.0	36.9	24.4	13.5	4.5	0.3
23	0.2	3.7	14.4	26.3	38.2	49.6	55.2	59.6	61.5	56.5	50.8	39.4	30.8	14.7	3.8	0.2
30	0.1	3.5	13.1	25.9	39.4	49.6	58.3	62.8	65.1	59.5	49.8	39.2	26.2	13.7	3.3	0.1
Aug. 6	----	2.2	10.7	22.5	35.2	44.6	52.6	55.1	56.6	53.5	46.4	35.0	23.7	12.3	2.4	----
13	----	2.2	10.5	23.1	34.8	45.9	54.4	57.5	58.5	56.9	46.7	35.0	21.9	10.5	1.9	----
20	----	1.7	8.8	20.7	32.2	41.9	49.4	55.3	55.2	50.1	45.5	35.8	24.5	9.5	1.6	----
27	----	1.0	7.7	19.4	31.7	42.7	50.1	55.7	55.2	51.9	43.7	30.9	19.6	7.7	0.9	----
Sept. 3	----	0.6	6.2	17.0	28.5	41.3	46.5	52.0	51.1	47.5	39.7	30.4	18.4	9.5	0.8	----
10	----	0.4	5.3	15.5	36.7	29.0	44.0	48.6	50.0	44.9	39.1	29.1	17.6	6.1	0.4	----
17	----	0.2	4.3	16.7	28.4	39.2	45.8	49.0	49.9	46.2	39.3	28.9	16.1	4.6	0.2	----
24	----	----	3.4	13.2	24.4	34.8	40.5	48.0	49.6	46.7	39.5	28.1	15.0	4.1	----	----
Oct. 1	----	----	2.3	12.4	25.7	35.7	41.6	47.2	48.7	44.7	32.0	24.5	12.2	2.4	----	----
8	----	----	1.8	10.8	23.2	34.0	42.7	46.2	45.6	43.0	35.1	23.5	10.9	1.6	----	----
15	----	----	1.2	9.4	21.7	32.5	40.9	45.5	44.8	39.7	32.1	20.0	8.7	1.1	----	----
22	----	----	0.8	6.7	16.5	28.5	36.0	40.9	40.2	36.5	28.8	17.9	6.9	0.8	----	----
29	----	----	0.5	5.5	15.8	25.8	33.0	33.8	37.0	33.0	25.1	17.9	6.0	0.4	----	----
Nov. 5	----	----	0.3	4.2	13.6	22.9	31.5	34.7	35.0	30.6	23.8	14.3	4.5	0.3	----	----
12	----	----	0.1	3.1	10.9	19.4	27.8	31.6	31.2	26.2	19.8	11.3	3.2	0.1	----	----
19	----	----	----	2.4	10.1	19.3	26.1	30.0	29.8	25.1	20.6	10.6	2.6	----	----	----
26	----	----	----	1.8	8.7	18.0	24.7	27.0	27.1	23.8	16.3	9.9	2.2	----	----	----
Dec. 3	----	----	----	1.6	8.2	17.2	24.8	30.3	27.8	25.1	17.7	9.5	1.8	----	----	----
10	----	----	----	1.3	6.7	13.2	19.0	22.2	22.0	18.9	14.0	7.3	1.3	----	----	----
17	----	----	----	1.3	6.7	14.8	20.9	24.0	24.0	20.7	14.6	7.8	1.5	----	----	----
24*	----	----	----	1.4	7.8	15.6	22.0	24.4	25.3	21.8	15.5	8.0	1.7	----	----	----
Means..	0.1	1.5	6.0	14.6	25.1	34.9	42.0	45.8	46.0	42.2	35.1	25.4	15.1	6.3	1.5	0.1

* 8-day means.

TABLE 9.—*Mean hourly totals of solar and sky radiation on a horizontal surface, New York, N. Y., 1936–39, inclusive (apparent solar time)*

Week beginning	Gram calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	2	6	12	16	19	17	14	10	4	1	----	----	----
8	----	----	----	1	6	13	19	20	18	15	10	4	1	----	----	----
15	----	----	----	1	6	12	16	19	20	18	12	6	2	----	----	----
22	----	----	----	1	8	16	22	26	27	27	19	12	2	----	----	----
29	----	----	----	2	8	18	23	26	25	23	18	10	3	----	----	----
Feb. 5	----	----	----	2	10	18	24	29	30	28	23	14	5	----	----	----
12	----	----	----	4	12	19	24	28	28	25	20	14	6	----	----	----
19	----	----	----	6	16	24	30	31	30	26	20	12	6	----	----	----
26	----	----	1	6	16	27	37	40	41	34	38	18	9	1	----	----
Mar. 5	----	----	1	7	16	24	39	36	32	31	28	18	10	2	----	----
12	----	----	2	8	16	23	26	28	28	24	22	16	10	3	----	----
19	----	----	4	14	28	38	46	51	50	44	37	26	14	4	----	----
26	----	----	5	14	26	34	42	45	48	40	34	24	16	5	----	----
Apr. 2	----	----	4	10	21	29	32	34	35	32	30	20	14	5	----	----
9	----	1	6	16	28	39	43	45	43	39	33	24	16	6	1	----
16	----	2	6	17	28	40	45	46	47	44	38	28	19	9	2	----
23	----	2	10	22	34	46	52	54	56	50	42	32	22	9	2	----
30	----	2	11	25	38	48	57	62	57	54	44	32	24	12	3	----
May 7	----	2	11	20	31	43	53	56	54	50	47	37	25	15	4	----
14	----	4	13	28	38	46	51	53	50	48	42	35	28	15	6	----
21	----	4	14	26	36	54	56	58	61	60	50	46	28	16	6	----
28	----	4	16	29	41	52	60	64	64	58	50	42	30	18	7	----
June 4	----	5	16	27	39	52	58	59	59	58	49	39	29	16	6	----
11	1	4	14	25	41	46	50	54	52	52	47	36	23	12	6	1
18	1	5	13	24	34	44	47	51	54	51	45	36	26	15	6	1
25	1	4	12	22	32	42	46	48	42	42	39	30	19	12	4	1
July 2	1	8	20	30	44	56	62	62	62	60	52	43	31	18	6	1
9	----	4	13	25	36	49	56	62	58	51	41	34	22	13	6	----
16	----	3	11	22	35	44	49	51	50	51	45	36	24	13	5	----
23	----	2	10	18	27	38	45	52	54	48	39	29	20	11	4	----
30	----	2	11	24	35	48	54	58	57	52	47	34	25	13	4	----
Aug. 6	----	2	9	18	31	44	50	56	50	47	37	33	22	11	3	----
13	----	2	10	20	30	42	52	56	52	49	40	35	23	12	2	----
20	----	2	8	18	30	40	45	49	50	44	35	26	18	8	2	----
27	----	1	6	14	27	37	44	51	50	44	36	30	20	8	2	----
Sept. 3	----	1	5	18	29	41	49	52	56	50	41	30	18	8	2	----
10	----	1	4	13	25	34	41	44	45	44	38	27	18	8	1	----
17	----	----	3	11	21	28	35	38	37	38	34	24	15	6	----	----
24	----	----	3	10	19	28	37	41	48	35	32	23	11	3	----	----
Oct. 1	----	----	2	10	20	31	38	42	48	39	30	20	12	3	----	----
8	----	----	2	8	18	29	34	37	36	34	26	18	9	3	----	----
15	----	----	2	9	20	30	38	42	40	38	28	18	7	1	----	----
22	----	----	----	4	13	20	25	27	31	27	20	12	5	----	----	----
29	----	----	----	4	11	23	30	33	32	31	22	13	4	----	----	----
Nov. 5	----	----	----	3	11	20	28	33	33	30	22	12	4	----	----	----
12	----	----	----	2	10	22	28	29	28	26	19	10	2	----	----	----
19	----	----	----	2	7	15	21	24	24	20	14	7	2	----	----	----
26	----	----	----	1	8	22	23	28	26	20	14	7	2	----	----	----
Dec. 3	----	----	----	1	5	10	14	21	21	17	13	6	1	----	----	----
10	----	----	----	1	4	10	20	23	22	19	14	6	1	----	----	----
17	----	----	----	----	4	10	16	20	21	15	10	5	----	----	----	----
24*	----	----	----	1	4	10	18	22	22	20	14	6	1	----	----	----
Means..	0.1	1	5	12	22	32	38	41	41	37	31	22	14	6	2	0.1

* 8-day means.

TABLE 10.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Lincoln, Nebr., 1925–39, inclusive (apparent solar time)*

Week beginning	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	1	7	18	25	31	31	27	19	10	1	----	----
8	----	----	1	8	19	26	33	31	27	20	10	2	----	----
15	----	----	1	9	20	28	33	33	28	21	11	2	----	----
22	----	----	2	13	25	34	40	39	34	26	14	3	----	----
29	----	----	3	12	23	32	37	37	33	25	14	4	----	----
Feb. 5	----	----	4	16	27	37	41	42	37	29	17	5	----	----
12	----	----	5	16	28	38	43	42	39	30	18	6	----	----
19	----	----	5	19	32	41	47	46	40	32	21	7	----	----
26	----	1	10	22	37	45	51	51	45	36	24	10	1	----
Mar. 5	----	1	11	25	38	47	52	52	47	37	25	12	2	----
12	----	2	14	28	39	47	51	50	45	37	27	14	3	----
19	----	3	15	29	41	50	55	55	48	41	29	16	5	----
26	----	4	16	28	40	49	53	53	49	40	29	16	5	----
Apr. 2	----	5	17	30	41	49	53	54	49	42	30	18	6	----
9	----	7	21	35	48	55	60	60	54	44	32	20	9	----
16	1	9	22	37	48	56	60	59	54	45	35	22	10	2
23	1	10	22	35	45	50	55	57	51	44	34	22	11	2
30	2	12	25	38	40	56	59	57	53	47	43	25	12	3
May 7	2	12	23	34	45	51	54	51	48	42	34	23	13	3
14	4	14	28	40	51	59	64	64	58	51	42	29	16	5
21	5	18	32	46	57	65	68	67	64	57	45	32	18	6
28	5	16	30	41	52	56	62	64	59	51	40	29	17	6
June 4	6	19	31	44	54	60	68	65	60	53	43	31	19	6
11	5	16	29	42	54	60	63	64	62	54	42	30	19	7
18	6	18	31	46	57	66	68	70	62	57	46	34	20	7
25	6	19	33	46	58	68	73	70	65	57	46	33	20	7
July 2	6	18	33	47	58	67	72	72	69	59	47	34	20	7
9	6	18	33	46	59	68	71	71	67	59	47	34	19	6
16	5	17	30	45	58	67	70	70	66	56	45	32	18	6
23	4	16	31	42	56	64	68	70	66	55	43	29	15	5
30	3	15	27	42	51	60	64	65	59	50	41	29	16	4
Aug. 6	2	12	25	39	51	61	65	65	59	49	39	27	13	3
13	1	10	22	36	49	59	64	65	61	50	39	26	12	2
20	1	10	23	37	49	59	64	65	57	50	38	25	11	2
27	1	8	19	32	43	50	60	60	54	45	36	22	8	1
Sept. 3	----	7	21	35	46	56	61	61	57	45	34	20	7	----
10	----	5	17	31	42	51	67	67	53	44	33	19	6	----
17	----	4	17	31	44	54	59	58	52	44	31	17	5	----
24	----	2	12	26	36	46	51	50	45	37	27	13	3	----
Oct. 1	----	2	11	25	36	43	49	49	44	36	25	12	2	----
8	----	1	9	21	31	40	45	46	40	32	22	10	2	----
15	----	1	8	20	33	42	46	46	42	33	21	9	1	----
22	----	----	6	19	31	40	46	46	41	34	21	7	----	----
29	----	----	5	14	25	34	38	39	34	26	16	5	----	----
Nov. 5	----	----	4	14	25	34	39	39	35	26	15	5	----	----
12	----	----	2	11	21	29	34	34	30	22	12	3	----	----
19	----	----	2	11	22	30	34	35	30	20	12	3	----	----
26	----	----	1	9	19	26	31	29	27	19	9	2	----	----
Dec. 3	----	----	1	8	17	25	29	29	26	19	9	2	----	----
10	----	----	1	6	15	23	27	27	24	16	8	1	----	----
17	----	----	1	8	17	26	30	31	26	19	9	1	----	----
24*	----	----	1	7	16	24	28	30	26	19	9	1	----	----
Means	1	6	15	27	38	47	52	52	47	38	28	16	7	2

*8-day means.

TABLE 11.—*Mean maximum hourly totals of solar and sky radiation on a horizontal surface, Lincoln, Nebr., 1925–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	1	10	24	35	39	40	35	25	13	2	----	----
8	----	----	2	11	23	34	41	41	34	25	13	3	----	----
15	----	----	2	12	27	36	43	41	37	24	13	3	----	----
22	----	----	3	15	29	43	49	48	42	32	16	4	----	----
29	----	----	4	15	31	43	49	49	44	33	19	4	----	----
Feb. 5	----	----	6	20	34	44	48	50	44	35	19	7	----	----
12	----	----	6	21	38	48	53	52	51	42	25	9	----	----
19	----	----	8	22	41	52	61	60	53	42	28	10	----	----
26	----	1	12	30	45	56	64	63	59	47	29	13	2	----
Mar. 5	----	2	13	31	48	56	63	61	56	46	32	15	3	----
12	----	4	18	35	48	57	60	59	52	44	33	19	4	----
19	----	5	20	37	52	66	69	65	59	53	36	20	6	----
26	----	6	21	36	52	66	71	74	66	55	35	24	7	----
Apr. 2	----	8	23	42	55	67	74	76	67	59	42	26	8	----
9	1	12	29	44	62	72	78	79	68	57	43	26	12	2
16	3	13	30	47	63	71	75	75	72	61	44	31	12	2
23	2	16	34	52	67	78	84	83	72	60	48	34	15	3
30	5	16	37	51	61	71	74	74	64	61	46	34	16	4
May 7	4	10	31	45	55	65	69	75	72	64	49	33	17	5
14	6	21	39	58	70	83	88	86	75	68	57	40	21	7
21	7	33	41	54	69	76	82	82	78	66	52	37	22	7
28	7	22	40	59	73	79	82	81	75	68	55	42	24	8
June 4	10	23	42	57	66	75	83	80	75	66	50	37	22	8
11	8	24	39	59	73	83	86	88	82	74	60	48	26	11
18	8	24	39	55	69	78	80	84	79	71	56	42	25	8
25	8	25	40	57	69	78	84	83	78	70	57	40	24	10
July 2	9	25	42	58	71	81	83	83	81	69	56	40	24	9
9	8	22	42	56	71	80	81	82	80	71	56	40	24	8
16	6	21	37	54	69	77	82	83	76	66	60	36	22	8
23	5	19	38	53	65	72	81	82	78	62	51	38	20	6
30	4	17	36	49	62	70	77	76	69	59	46	35	18	5
Aug. 6	4	16	31	49	64	78	76	78	71	61	46	35	17	4
13	2	12	30	45	64	73	83	79	78	63	46	31	15	3
20	2	13	28	44	60	72	75	78	74	59	48	34	14	3
27	1	10	25	44	61	69	72	71	66	56	43	34	11	2
Sept. 3	----	9	26	41	54	64	72	73	70	56	42	27	10	----
10	----	8	26	42	57	70	74	75	68	58	43	25	8	----
17	----	6	23	39	54	65	70	69	65	54	40	23	6	----
24	----	4	16	34	45	59	65	65	60	50	34	17	4	----
Oct. 1	----	2	16	32	45	55	65	61	52	44	31	15	4	----
8	----	1	12	26	40	53	56	61	55	44	30	14	3	----
15	----	1	12	26	41	53	59	59	54	43	29	12	2	----
22	----	----	10	25	40	50	54	53	49	40	24	9	----	----
29	----	----	8	20	35	46	48	49	44	35	21	8	----	----
Nov. 5	----	----	6	18	34	44	47	48	44	34	20	6	----	----
12	----	----	4	16	31	40	47	48	41	33	20	5	----	----
19	----	----	3	16	29	37	44	42	37	27	13	4	----	----
26	----	----	2	10	24	32	40	40	35	26	13	3	----	----
Dec. 3	----	----	1	10	25	34	38	36	33	24	13	3	----	----
10	----	----	1	11	25	35	40	38	33	22	11	2	----	----
17	----	----	1	10	22	32	36	38	33	23	12	2	----	----
24*	----	----	1	10	22	30	34	36	33	24	12	2	----	----
Means	2	9	20	35	49	59	64	64	59	49	35	21	9	2
Percentage of average values	----	----	133	130	129	123	123	123	126	126	125	131	----	----

*8-day means.

TABLE 12.—*Mean minimum hourly totals of solar and sky radiation on a horizontal surface, Lincoln, Nebr., 1925–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—														
	A. M.							P. M.							
	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7
Jan. 1	----	----	----	3	7	10	12	14	11	6	2	----	----	----
8	----	----	1	4	10	17	18	20	20	14	7	1	----	----
15	----	----	1	6	12	17	16	18	18	12	7	2	----	----
22	----	----	1	9	17	18	28	28	26	18	10	2	----	----
29	----	----	2	7	15	21	22	22	19	14	8	2	----	----
Feb. 5	----	----	2	8	17	23	30	29	28	20	13	4	----	----
12	----	----	3	12	21	27	30	28	26	22	13	4	----	----
19	----	----	4	14	21	31	40	38	33	24	16	5	----	----
26	----	1	7	16	26	30	33	33	24	19	14	5	1	----
Mar. 5	----	1	8	19	30	39	44	42	36	26	18	8	1	----
12	----	1	10	21	29	36	40	37	32	26	21	11	2	----
19	----	2	10	19	25	35	39	41	34	26	17	9	2	----
26	----	2	11	18	27	35	40	31	31	27	19	9	1	----
Apr. 2	----	3	8	16	25	27	29	36	35	33	25	13	4	----
9	----	2	6	12	18	20	22	20	21	15	11	7	2	----
16	----	6	12	21	31	34	29	36	39	33	18	10	6	----
23	----	4	7	13	20	26	26	25	24	16	13	11	6	----
30	1	6	11	17	23	22	28	30	26	25	20	12	8	1
May 7	1	6	13	19	32	33	37	31	20	26	22	17	8	1
14	1	4	8	10	13	18	23	19	15	13	10	7	4	2
21	2	12	25	28	36	43	50	41	30	32	30	19	14	4
28	2	8	17	23	28	33	37	38	35	29	19	16	10	4
June 4	3	11	16	24	36	34	49	45	37	38	31	22	14	4
11	3	10	18	24	32	41	41	34	28	27	22	15	9	4
18	4	11	24	37	43	50	42	36	41	43	34	25	14	5
25	5	13	22	36	47	48	58	60	52	49	36	24	14	5
July 2	4	12	22	30	36	49	58	56	52	44	32	25	16	5
9	3	8	19	32	40	40	42	42	42	44	37	28	14	5
16	3	11	21	34	48	56	53	56	44	41	39	25	12	4
23	2	12	21	34	42	49	59	61	56	41	32	22	12	3
30	1	9	15	22	30	41	49	57	46	38	29	24	13	3
Aug. 6	1	7	20	29	40	51	53	53	40	34	21	16	9	2
13	1	5	13	25	32	35	49	51	51	40	28	22	10	1
20	1	5	16	28	34	41	45	51	46	38	29	20	8	1
27	----	3	8	16	24	30	33	36	27	28	17	11	4	----
Sept. 3	----	2	9	19	24	37	38	45	36	24	18	8	1	----
10	----	3	11	20	25	33	35	35	30	25	16	9	4	----
17	----	2	8	19	31	37	39	36	30	26	19	9	4	----
24	----	1	4	12	10	21	26	21	18	16	12	7	2	----
Oct. 1	----	1	6	14	21	21	25	27	23	17	15	8	1	----
8	----	----	6	14	22	27	30	33	29	22	14	7	----	----
15	----	----	4	15	20	18	19	20	21	16	9	4	----	----
22	----	----	2	10	18	27	27	27	29	26	16	5	----	----
29	----	----	2	8	13	24	23	23	19	15	8	3	----	----
Nov. 5	----	----	2	6	12	19	27	29	24	18	11	3	----	----
12	----	----	1	2	5	8	12	14	12	9	5	1	----	----
19	----	----	1	7	16	16	18	19	12	10	7	1	----	----
26	----	----	1	3	6	9	10	14	12	8	4	1	----	----
Dec. 3	----	----	----	3	10	16	18	18	15	11	4	----	----	----
10	----	----	----	2	5	9	12	12	7	5	2	----	----	----
17	----	----	----	5	14	21	25	25	22	16	7	----	----	----
24*	----	----	----	3	9	14	16	17	15	10	6	----	----	----
Means	1	4	9	16	24	29	33	33	29	24	17	10	4	1
Percentage of average values	----	----	60	59	63	62	63	63	62	63	61	62	----	----

*8-day means.

TABLE 13.—*Mean hourly totals of solar and sky radiation received on a horizontal surface, Chicago, Ill., 1923–39, inclusive (apparent solar time)*

Week beginning—	Gram calories per square centimeter for hour ending—														
	A. M.							P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	0.4	3.4	8.4	11.9	15.2	14.8	12.7	9.1	4.4	0.6	----	----	----
8	----	----	----	0.4	3.3	7.9	12.4	14.9	14.7	12.2	8.3	3.9	0.5	----	----	----
15	----	----	----	0.7	3.7	8.8	13.3	17.1	17.2	15.0	10.7	5.2	0.7	----	----	----
22	----	----	----	1.0	5.8	12.1	17.4	21.4	22.3	19.2	12.6	5.9	0.8	----	----	----
29	----	----	----	1.2	5.7	11.6	17.1	20.6	20.8	18.1	13.4	7.3	1.7	----	----	----
Feb. 5	----	----	----	1.9	6.7	13.2	18.4	22.5	23.0	19.9	14.5	7.6	2.0	----	----	----
12	----	----	0.1	2.4	8.0	14.8	20.1	21.0	23.6	21.8	16.1	9.6	3.1	0.2	----	----
19	----	----	0.4	3.7	10.9	14.8	24.6	27.9	27.8	24.9	18.8	11.4	4.3	0.4	----	----
26	----	----	0.5	4.8	12.6	20.5	27.1	31.5	32.1	29.1	23.1	14.0	5.8	0.6	----	----
Mar. 5	----	----	1.0	6.0	13.6	21.6	28.7	32.0	31.6	28.8	22.6	16.1	7.5	1.0	----	----
12	----	----	1.4	7.0	15.2	22.1	29.9	32.6	33.6	30.2	24.1	16.5	7.4	1.8	----	----
19	----	----	2.2	8.9	17.0	25.6	30.6	32.8	34.3	33.1	26.9	18.3	9.4	2.2	----	----
26	----	----	3.1	9.6	18.1	26.8	32.7	35.5	34.1	31.3	26.4	18.9	10.5	3.1	----	----
Apr. 2	----	----	4.5	13.4	21.6	31.1	36.6	40.6	39.9	34.9	27.8	19.4	12.1	4.2	----	----
9	----	0.7	6.1	14.9	25.6	35.7	42.8	44.4	44.5	40.4	33.6	24.3	14.9	5.6	0.6	----
16	----	1.2	7.1	13.8	25.5	33.8	38.7	41.2	42.3	37.8	30.6	25.5	16.9	7.4	1.0	----
23	----	1.8	8.1	16.6	26.2	35.7	43.2	44.9	44.4	41.4	34.8	28.1	18.8	9.1	1.9	----
30	----	2.2	8.4	19.4	29.4	37.9	42.5	45.7	46.9	44.4	38.8	30.5	20.3	10.2	2.6	----
May 7	----	3.1	11.7	21.0	31.2	37.2	47.1	49.2	50.4	47.2	39.5	28.5	20.2	10.6	2.9	----
14	----	3.7	11.7	21.8	31.3	39.6	46.7	50.5	50.9	48.2	42.2	33.1	23.2	12.8	3.6	----
21	0.5	4.2	13.6	24.6	34.6	42.3	51.2	54.8	53.3	49.4	43.9	35.5	25.6	13.8	4.3	0.4
28	0.4	5.1	13.9	25.9	35.7	45.6	52.1	53.8	54.1	50.1	43.1	34.8	25.6	14.6	5.1	0.2
June 4	0.5	5.2	14.2	25.5	36.2	45.4	52.3	55.6	53.0	50.1	44.8	35.2	25.8	15.6	5.0	0.6
11	0.7	5.7	14.4	25.0	36.1	44.6	50.7	55.0	56.0	51.3	43.9	36.2	26.0	15.1	6.1	0.8
18	0.8	5.6	14.9	26.6	37.0	44.8	49.5	53.8	52.9	50.7	45.3	36.5	26.2	16.2	5.6	0.8
25	0.7	5.6	14.9	24.9	36.4	42.9	48.8	50.6	51.4	49.1	42.0	35.0	25.8	14.9	5.5	0.6
July 2	0.6	5.4	14.5	25.3	36.2	45.3	50.9	53.6	55.2	53.6	45.4	39.1	27.9	16.0	6.0	0.6
9	0.5	5.4	14.6	25.7	36.3	43.9	52.7	57.7	54.4	51.8	45.5	35.3	25.9	14.9	5.6	0.5
16	0.4	5.1	14.4	25.1	34.4	46.8	51.9	52.6	53.6	50.4	45.0	36.4	24.9	14.5	4.9	0.3
23	0.3	4.3	13.5	25.1	37.1	46.7	52.7	55.9	55.4	52.9	46.3	36.7	24.1	13.3	3.9	0.2
30	----	3.4	11.5	23.3	32.0	41.2	46.5	48.4	48.7	45.8	40.4	31.7	22.4	11.9	3.2	----
Aug. 6	----	3.0	10.7	21.2	28.7	40.9	47.3	50.7	52.0	48.8	41.4	29.2	20.7	10.4	2.4	----
13	----	2.3	9.5	20.1	31.4	42.1	48.5	50.8	50.3	47.1	40.1	31.1	20.3	9.6	2.0	----
20	----	1.7	8.9	18.5	30.6	41.4	49.0	53.2	53.6	50.9	43.0	32.6	20.9	9.4	1.8	----
27	----	0.9	6.8	17.3	27.9	37.8	45.7	48.1	45.6	41.3	34.1	27.4	16.9	7.0	0.9	----
Sept. 3	----	0.7	5.9	15.2	27.3	36.1	43.9	47.1	47.5	42.1	34.4	26.6	16.3	6.1	0.7	----
10	----	----	4.2	13.4	23.6	33.4	38.9	45.0	43.3	37.2	31.2	23.7	13.6	4.4	----	----
17	----	----	3.9	13.1	24.7	34.3	43.3	47.6	47.5	44.1	36.6	25.9	13.8	3.8	----	----
24	----	----	2.3	9.9	19.9	28.4	35.9	40.1	39.1	36.8	29.4	20.0	10.3	2.2	----	----
Oct. 1	----	----	1.6	8.2	17.7	26.5	35.5	38.8	38.1	33.8	25.8	18.3	8.4	1.4	----	----
8	----	----	0.9	6.0	14.8	22.8	29.9	33.0	33.4	30.8	24.4	16.2	6.7	0.8	----	----
15	----	----	0.5	5.1	13.6	22.4	27.5	32.5	32.4	27.8	22.2	14.1	5.1	0.5	----	----
22	----	----	----	3.2	10.4	17.0	24.6	27.4	28.7	24.9	18.4	12.4	3.8	----	----	----
29	----	----	----	2.8	8.5	16.2	22.1	24.0	25.4	22.8	16.7	9.4	2.7	----	----	----
Nov. 5	----	----	----	1.7	7.5	14.3	19.8	23.2	24.2	20.6	15.5	8.3	2.0	----	----	----
12	----	----	----	1.1	5.4	11.1	16.5	19.8	20.3	18.2	11.8	6.4	1.3	----	----	----
19	----	----	----	0.9	6.0	13.1	17.9	20.8	20.0	17.1	11.9	6.2	1.1	----	----	----
26	----	----	----	0.5	3.9	8.8	13.9	17.3	17.0	14.9	10.2	4.7	0.6	----	----	----
Dec. 3	----	----	----	----	2.8	6.9	10.9	13.6	14.1	12.4	8.5	3.8	----	----	----	----
10	----	----	----	----	2.7	7.9	12.4	14.9	15.1	12.9	8.9	3.8	----	----	----	----
17	----	----	----	----	2.8	7.2	12.2	14.2	15.0	12.5	8.2	3.6	----	----	----	----
24*	----	----	----	----	3.5	9.0	12.5	15.0	15.2	12.9	8.7	3.7	----	----	----	----
Means	0.1	1.5	5.3	11.6	19.6	27.5	33.6	36.7	36.8	33.8	27.7	20.2	12.0	5.5	1.5	0.1

*8-day means.

TABLE 14.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Blue Hill, Mass., 1936–39, inclusive (apparent solar time)*

Week beginning	Gram calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	2	7	16	21	25	22	18	14	6	1	----	----	----
8	----	----	----	2	8	18	26	29	30	25	18	8	2	----	----	----
15	----	----	----	2	8	18	24	26	27	24	17	8	2	----	----	----
22	----	----	----	2	11	22	29	31	33	28	22	12	3	----	----	----
29	----	----	----	5	14	26	32	33	32	30	28	11	3	----	----	----
Feb. 5	----	----	1	5	14	26	32	33	32	30	21	11	3	----	----	----
12	----	----	----	9	14	26	30	32	32	29	20	12	4	----	----	----
19	----	----	1	9	19	29	36	38	36	32	25	15	6	1	----	----
26	----	----	2	9	20	31	41	47	48	42	34	22	10	1	----	----
Mar. 5	----	----	2	13	24	28	40	44	43	39	31	21	11	2	----	----
12	----	----	4	11	18	35	43	42	38	32	28	18	8	2	----	----
19	----	----	5	17	29	42	50	52	54	48	30	28	16	5	----	----
26	----	----	6	19	30	40	47	51	51	46	38	27	16	5	----	----
Apr. 2	----	1	8	18	28	38	40	42	43	39	31	22	15	6	----	----
9	----	1	6	15	24	30	34	38	34	33	32	27	21	7	1	----
16	----	2	10	20	32	40	45	50	50	43	45	26	18	8	2	----
23	----	3	12	26	38	48	50	55	54	50	42	33	23	10	2	----
30	----	4	13	24	39	51	62	64	63	58	49	37	25	11	2	----
May 7	----	4	13	26	38	47	50	52	56	56	45	36	21	9	3	----
14	----	5	16	30	40	52	58	53	67	54	51	43	22	11	3	----
21	----	5	16	29	39	48	56	56	59	59	54	43	26	15	4	
28	1	8	22	35	47	60	63	74	71	68	58	45	30	18	5	1
June 4	1	6	18	32	45	55	59	74	70	65	48	46	32	17	5	1
11	1	5	16	26	38	47	49	55	58	56	46	41	29	18	5	1
18	1	7	19	32	44	55	61	67	66	62	52	42	31	19	6	1
25	1	4	12	20	31	40	44	50	48	44	37	35	24	15	5	1
July 2	1	8	20	34	46	59	67	72	73	68	56	47	32	18	6	1
9	1	6	16	26	37	47	56	60	63	61	54	37	25	14	4	1
16	----	6	17	30	42	51	58	63	60	57	58	36	24	15	5	----
23	----	4	14	24	35	42	53	57	60	57	44	37	23	12	4	----
30	----	3	12	24	40	51	60	67	62	60	50	44	28	12	4	
Aug. 6	----	3	13	27	40	50	60	60	63	58	49	40	26	12	3	----
13	----	2	11	24	37	48	55	58	62	56	46	36	24	12	3	----
20	----	1	9	21	34	48	52	57	56	53	41	33	20	9	2	----
27	----	1	8	19	34	46	53	54	53	49	42	33	22	9	2	----
Sept. 3	----	1	10	25	38	52	62	66	62	58	48	38	22	8	1	----
10	----	----	6	17	28	38	48	52	52	49	38	26	16	6	----	----
17	----	----	5	16	26	36	42	42	44	41	33	26	15	5	----	----
24	----	----	4	14	26	37	44	50	50	42	36	25	14	4	----	----
Oct. 1	----	----	2	11	22	31	39	46	46	40	31	23	12	2	----	----
8	----	----	1	10	23	34	43	45	43	39	30	19	9	2	----	----
15	----	----	1	9	22	33	39	43	41	38	29	18	8	1	----	----
22	----	----	----	6	16	25	30	33	32	28	22	14	6	----	----	----
29	----	----	----	4	15	26	32	35	35	32	24	15	5	----	----	----
Nov. 5	----	----	----	4	12	22	32	38	37	38	25	14	4	----	----	----
12	----	----	----	3	12	22	27	32	32	26	20	11	2	----	----	----
19	----	----	----	2	8	16	20	22	23	20	14	8	2	----	----	----
26	----	----	----	2	10	19	28	31	32	28	19	10	2	----	----	----
Dec. 3	----	----	----	1	6	13	18	21	20	18	13	6	1	----	----	----
10	----	----	----	1	7	15	20	27	27	22	15	8	1	----	----	----
17	----	----	----	1	6	13	20	24	22	20	14	6	1	----	----	----
24*	----	----	----	1	7	16	22	25	26	22	14	8	2	----	----	----
Means..	0.1	2	7	15	26	36	42	46	46	42	34	25	14	6	1	0.1

* 8-day means.

TABLE 15.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Twin Falls, Idaho, 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	1	5	14	20	23	24	20	15	7	1	----	----	----
8	----	----	----	1	5	12	18	21	21	18	14	6	2	----	----	----
15	----	----	----	1	5	14	21	24	26	22	17	9	1	----	----	----
22	----	----	----	1	8	19	26	28	30	28	22	12	2	----	----	----
29	----	----	----	2	8	17	25	28	30	27	20	13	4	----	----	----
Feb. 5	----	----	----	3	11	22	28	31	33	28	22	14	6	----	----	----
12	----	----	1	6	15	30	32	34	36	32	24	18	8	1	----	----
19	----	----	1	7	17	27	36	38	38	34	29	17	9	1	----	----
26	----	----	1	9	19	31	38	40	41	38	31	21	11	1	----	----
Mar. 5	----	----	2	14	27	28	46	48	50	47	36	26	14	3	----	----
12	----	----	3	12	22	30	37	41	40	36	28	23	13	3	----	----
19	----	----	6	18	30	42	49	49	50	47	40	29	16	4	----	----
26	----	----	8	21	32	41	49	51	51	44	38	27	17	6	----	----
Apr. 2	----	1	12	26	42	49	58	60	58	47	40	31	20	8	1	----
9	----	2	12	25	37	49	54	54	55	54	45	32	20	10	2	----
16	----	3	17	31	44	56	64	64	65	58	50	37	26	13	3	----
23	----	4	16	29	41	52	57	60	58	52	44	38	23	12	3	----
30	----	6	17	25	40	49	58	58	58	55	47	38	26	14	6	----
May 7	1	9	22	38	50	61	68	68	69	65	55	43	30	17	6	1
14	1	9	21	32	44	55	60	60	70	63	52	42	31	17	7	1
21	1	12	29	43	54	64	71	72	71	65	58	47	35	20	8	1
28	1	10	24	38	49	58	66	65	67	62	53	42	33	20	9	1
June 4	1	10	22	34	47	57	64	66	68	61	56	46	32	22	10	1
11	1	8	20	34	50	60	62	60	60	57	49	41	31	21	11	2
18	2	12	24	37	50	60	65	70	70	64	55	43	32	22	12	2
25	2	11	19	37	47	55	64	64	65	56	52	42	30	22	10	2
July 2	1	9	20	32	43	53	62	65	66	58	51	43	33	22	9	1
9	1	9	23	38	50	62	65	67	64	58	53	39	30	18	8	1
16	1	10	24	38	52	63	68	71	72	65	56	47	34	21	8	1
23	1	6	18	32	46	57	64	64	62	61	53	40	29	18	7	1
30	----	6	20	33	45	56	63	66	66	63	56	44	31	18	6	----
Aug. 6	----	5	17	31	46	59	65	68	66	57	50	42	30	16	4	----
13	----	4	18	32	47	57	64	67	67	58	51	42	29	15	3	----
20	----	4	16	30	44	54	62	66	64	58	51	38	26	12	3	----
27	----	2	11	25	38	51	57	56	58	54	50	36	23	9	1	----
Sept. 3	----	2	12	27	40	51	59	62	63	56	47	37	20	8	1	----
10	----	1	10	24	36	45	48	55	57	53	45	34	17	5	1	----
17	----	----	7	22	36	46	52	53	54	52	42	30	17	4	----	----
24	----	----	5	16	32	42	51	52	53	46	38	23	13	3	----	----
Oct. 1	----	----	3	13	24	32	39	41	42	39	32	22	11	2	----	----
8	----	----	2	10	21	30	38	42	44	40	33	22	10	2	----	----
15	----	----	1	9	20	30	36	36	36	32	25	16	6	1	----	----
22	----	----	1	8	17	32	38	40	40	35	27	16	6	1	----	----
29	----	----	----	4	13	22	29	31	34	33	25	15	4	----	----	----
Nov. 5	----	----	----	4	14	25	31	28	32	28	22	13	3	----	----	----
12	----	----	----	2	8	19	24	26	29	26	20	10	3	----	----	----
19	----	----	----	2	8	18	25	27	28	25	19	9	2	----	----	----
26	----	----	----	2	6	15	22	27	25	22	16	8	2	----	----	----
Dec. 3	----	----	----	1	5	14	20	23	24	20	14	6	1	----	----	----
10	----	----	----	1	5	13	20	22	22	18	14	6	1	----	----	----
17	----	----	----	1	5	13	19	22	22	19	14	6	1	----	----	----
24*	----	----	----	1	6	13	18	20	22	18	13	6	1	----	----	----
Means..	0.3	3	9	19	29	39	46	48	48	44	37	27	16	8	3	0.3

*8-day means.

TABLE 16.—*Mean hourly totals of solar and sky radiation on a horizontal surface. Madison, Wis., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	----	3	9	16	20	20	17	13	6	1	----	----	----
8	----	----	----	----	5	11	17	20	20	18	16	6	1	----	----	----
15	----	----	----	1	5	12	17	21	23	20	16	7	1	----	----	----
22	----	----	----	2	10	20	28	34	34	28	21	11	2	----	----	----
29	----	----	----	2	9	19	27	32	33	28	20	12	3	----	----	----
Feb. 5	----	----	----	3	11	20	28	30	30	27	21	11	4	----	----	----
12	----	----	----	4	15	25	34	36	37	32	24	14	5	----	----	----
19	----	----	----	6	17	28	37	40	39	40	26	15	6	1	----	----
26	----	----	1	7	14	27	32	35	36	32	28	18	8	1	----	----
Mar. 5	----	----	1	9	22	35	44	49	47	48	35	23	11	2	----	----
12	----	----	2	12	24	37	46	51	50	45	36	26	13	3	----	----
19	----	----	3	12	23	35	43	47	46	45	40	26	14	4	----	----
26	----	----	5	17	30	43	50	52	50	51	42	30	17	6	----	----
Apr. 2	----	----	6	17	30	38	43	45	44	42	38	28	17	7	1	----
9	----	1	8	20	32	49	52	54	52	46	40	30	18	8	1	----
16	----	1	8	19	28	34	40	42	42	44	40	31	20	9	2	----
23	----	1	8	19	30	40	48	50	51	48	41	32	19	8	2	----
30	----	2	12	26	38	46	52	60	61	56	47	38	27	14	4	----
May 7	----	4	15	28	41	52	60	64	58	54	46	38	26	14	4	----
14	----	4	13	26	39	49	59	61	62	57	49	36	26	16	5	----
21	----	4	16	26	36	50	59	62	62	60	54	40	30	16	6	1
28	----	5	16	27	38	50	56	59	56	54	51	43	33	20	8	1
June 4	1	7	18	31	43	53	61	66	60	56	48	40	26	18	7	2
11	1	6	17	29	42	54	64	62	64	59	52	40	30	20	8	1
18	1	8	20	33	46	56	63	66	69	63	55	43	32	19	7	1
25	1	6	17	30	42	53	63	62	62	58	51	38	28	16	7	1
July 2	1	6	18	32	42	54	66	70	72	67	58	47	32	19	7	1
9	----	6	19	34	47	61	64	69	70	66	57	46	30	20	8	1
16	----	5	16	31	45	55	66	67	68	63	53	41	28	17	6	1
23	----	6	17	31	44	56	60	70	72	63	52	41	30	18	6	----
30	----	4	17	30	43	54	63	67	68	63	52	40	30	17	4	----
Aug. 6	----	3	14	26	39	48	56	63	58	58	50	38	26	13	4	----
13	----	2	14	25	39	48	56	60	58	52	46	36	24	12	3	----
20	----	1	10	24	37	49	56	60	54	51	44	34	22	10	2	----
27	----	1	8	21	34	46	55	51	58	52	46	33	20	8	1	----
Sept. 3	----	----	6	17	28	37	44	51	53	48	38	29	16	6	1	----
10	----	----	5	17	27	34	40	46	45	43	42	26	14	6	----	----
17	----	----	4	16	30	42	50	54	54	50	39	29	16	4	----	----
24	----	----	2	12	23	33	41	45	45	41	33	22	12	3	----	----
Oct. 1	----	----	2	10	20	30	38	42	42	40	38	22	10	2	----	----
8	----	----	1	8	17	26	42	36	37	36	27	19	9	1	----	----
15	----	----	----	5	18	25	32	37	36	30	27	16	6	1	----	----
22	----	----	----	4	15	26	33	38	37	35	23	16	6	----	----	----
29	----	----	----	3	12	20	29	32	33	29	23	13	4	----	----	----
Nov. 5	----	----	----	2	11	23	33	37	35	31	24	12	3	----	----	----
12	----	----	----	2	10	20	29	30	34	32	22	12	2	----	----	----
19	----	----	----	1	8	16	22	26	27	23	16	9	2	----	----	----
26	----	----	----	1	6	14	22	23	27	20	15	7	1	----	----	----
Dec. 3	----	----	----	----	4	11	18	21	20	17	12	6	1	----	----	----
10	----	----	----	----	6	14	20	24	24	20	14	6	1	----	----	----
17	----	----	----	----	4	12	19	22	22	19	14	5	1	----	----	----
24*	----	----	----	----	4	11	19	23	22	20	16	7	1	----	----	----
Means..	0.1	2	7	15	25	35	43	46	46	42	35	25	15	7	2	0.2

*8-day means.

TABLE 17.—*Mean hourly totals of solar and sky radiation on a horizontal surface. Friday Harbor, Wash., 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—															
	A. M.								P. M.							
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8
Jan. 1	----	----	----	----	3	8	12	17	16	13	8	4	----	----	----	----
8	----	----	----	----	2	6	11	12	15	15	11	3	----	----	----	----
15	----	----	----	----	3	8	14	15	17	16	13	6	1	----	----	----
22	----	----	----	----	4	11	16	18	19	16	15	6	2	----	----	----
29	----	----	----	----	5	11	17	22	22	21	16	10	3	----	----	----
Feb. 5	----	----	----	1	4	12	16	22	28	20	14	9	3	----	----	----
12	----	----	----	1	8	17	25	29	32	30	23	13	5	1	----	----
19	----	----	----	3	10	18	23	28	35	23	28	12	6	1	----	----
26	----	----	----	5	13	21	32	40	40	37	31	20	9	2	----	----
Mar. 5	----	----	1	6	16	24	34	38	33	26	28	21	12	3	----	----
12	----	----	1	7	14	24	30	33	34	33	26	18	11	3	----	----
19	----	----	3	13	21	30	36	40	24	39	33	26	15	5	----	----
26	----	----	5	14	26	36	47	50	49	46	40	29	18	8	1	----
Apr. 1	----	----	6	15	26	38	44	53	55	48	34	27	15	6	1	----
9	----	1	6	13	22	30	41	46	46	43	36	29	18	8	2	----
16	----	2	11	20	34	48	52	56	53	54	49	39	28	11	2	----
23	----	2	10	26	38	48	57	57	58	54	48	39	24	12	4	----
30	----	4	16	29	39	49	52	59	61	59	54	38	26	16	5	----
May 7	1	6	17	28	44	52	60	62	60	57	52	40	26	16	6	----
14	1	8	19	32	46	56	62	65	68	62	54	42	30	17	6	1
21	3	10	21	38	47	58	62	69	66	61	54	43	30	17	6	1
28	2	8	18	28	41	49	54	56	60	58	56	44	32	20	8	1
June 4	2	9	20	31	43	51	60	70	70	68	61	48	35	22	9	2
11	2	8	16	25	36	42	48	53	52	49	43	34	27	17	8	2
18	2	8	20	30	40	53	59	62	66	61	52	45	34	20	10	2
25	2	9	20	33	48	59	66	70	70	64	59	47	35	23	11	2
July 2	2	6	16	28	40	52	62	64	62	56	50	42	33	19	10	2
9	2	8	22	37	51	61	68	72	73	69	63	51	37	24	10	2
16	1	8	31	39	50	64	72	78	76	73	66	53	38	23	9	2
23	1	8	21	35	54	63	70	74	74	69	62	50	36	21	9	1
30	----	5	16	34	48	60	70	76	74	72	65	52	36	22	8	1
Aug. 6	----	4	14	24	39	50	60	64	66	62	55	44	32	18	6	----
13	----	3	12	25	38	52	62	64	69	66	60	48	32	16	4	----
20	----	2	11	22	34	42	52	57	59	54	49	37	26	12	2	----
27	----	1	8	19	31	42	52	54	53	48	44	32	20	8	2	----
Sept. 3	----	1	7	18	31	46	54	60	59	56	46	33	20	8	1	----
10	----	----	6	17	30	41	52	56	55	51	42	30	17	5	----	----
17	----	----	3	12	20	31	37	46	47	41	35	24	13	3	----	----
24	----	----	2	12	17	26	32	39	40	39	32	21	10	2	----	----
Oct. 1	----	----	2	8	16	24	34	38	42	37	29	18	8	1	----	----
8	----	----	1	8	18	28	32	36	37	33	25	15	6	----	----	----
15	----	----	1	7	16	26	34	39	36	29	21	12	4	----	----	----
22	----	----	----	4	11	15	22	22	23	20	15	10	2	----	----	----
29	----	----	----	2	8	14	19	20	23	20	14	7	2	----	----	----
Nov. 5	----	----	----	2	7	12	16	18	17	16	13	6	1	----	----	----
12	----	----	----	1	6	11	14	16	16	12	7	3	----	----	----	----
19	----	----	----	1	6	14	19	21	20	17	11	4	----	----	----	----
26	----	----	----	----	4	10	16	18	18	13	8	3	----	----	----	----
Dec. 3	----	----	----	----	3	8	12	14	15	11	6	2	----	----	----	----
10	----	----	----	----	3	9	13	20	19	16	10	3	----	----	----	----
17	----	----	----	----	3	7	10	15	12	11	8	2	----	----	----	----
24*	----	----	----	----	2	6	10	13	16	9	5	3	----	----	----	----
Means..	0.4	2	7	14	23	32	39	43	44	40	34	25	16	8	3	0.4

*8-day means.

TABLE 18.—*Mean hourly totals of solar and sky radiation on a horizontal surface, Fairbanks, Alaska, 1936–39, inclusive (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending																			
	A. M.										P. M.									
	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10
Jan. 1									1	2	2	1								
8									2	4	4	2								
15									2	3	4	2								
22								2	5	8	9	6	3							
29								3	7	11	12	10	6							
Feb. 5							1	6	11	11	14	12	8	3						
12							2	7	11	44	14	13	9	3						
19							4	8	12	15	16	13	9	5						
26						3	9	15	20	25	24	21	19	11	3					
Mar. 5						4	10	16	22	25	25	22	16	10	4					
12					2	7	15	25	29	34	34	32	26	18	9	2				
19					3	8	16	24	30	31	32	28	22	16	9	3				
26				1	5	13	22	29	36	40	40	38	33	25	15	6	1			
Apr. 2				2	8	16	25	43	40	44	46	44	38	29	19	9	2			
9				3	9	17	25	34	42	46	45	42	46	28	19	10	4			
16				3	8	15	22	29	35	40	40	40	47	24	16	8	2			
23			2	5	13	22	29	36	42	47	48	44	40	34	24	18	8	2		
30			4	9	17	23	32	39	45	46	47	41	35	29	21	14	7	3		
May 7			3	8	16	25	34	43	48	52	51	48	38	33	26	16	10	5		
14		1	3	10	18	28	37	44	48	52	49	47	42	33	29	19	12	5	1	
21		2	5	10	17	25	34	40	46	50	46	36	37	35	26	17	10	6	2	
28		1	5	10	16	23	33	42	47	49	48	44	37	27	26	19	12	9	4	
June 4	1	2	6	14	21	27	44	41	46	47	49	46	43	38	32	23	16	8	3	1
11	1	3	6	11	18	26	45	44	49	52	52	50	44	39	31	24	16	9	4	2
18	1	2	6	12	20	26	35	41	45	50	48	45	40	36	28	23	16	9	4	1
25	1	3	6	12	18	25	32	40	45	46	46	45	40	32	26	20	13	8	4	1
July 2		2	6	11	18	24	30	36	40	46	45	44	40	42	30	23	14	8	3	
9		2	5	11	17	23	29	36	40	45	46	42	43	33	27	20	12	7	3	
16		2	5	11	19	29	34	38	44	46	49	50	40	35	28	20	12	6	2	
23		1	4	9	16	24	31	36	44	47	47	45	40	34	27	18	12	6	2	
30		1	3	8	14	21	29	36	39	42	42	41	36	30	24	16	9	4	1	
Aug. 6			2	6	12	18	25	31	40	39	45	36	36	29	22	14	7	2		
13			1	5	10	14	20	28	32	34	32	32	30	24	17	11	5	1		
20			1	3	7	12	16	22	23	23	23	21	23	18	15	8	4	1		
27				2	5	10	18	23	26	25	31	28	24	19	13	6	2			
Sept. 3				1	4	10	14	19	25	26	26	24	21	17	10	6	1			
10					3	8	14	18	25	30	28	25	20	14	9	3				
17					2	7	14	20	24	26	27	24	21	16	9	3				
24					1	4	9	14	20	23	21	18	15	10	5	1				
Oct. 1						3	8	13	18	20	22	20	16	10	4					
8						2	7	12	16	20	20	17	12	8	2					
15							4	9	13	16	14	14	8	4						
22							2	6	9	14	14	10	7	3						
29							1	4	6	8	8	8	5	2						
Nov. 5							1	4	8	10	10	8	4	1						
12								2	5	6	6	5	2							
19								1	3	4	5	3	1							
26								1	2	4	4	3	1							
Dec. 3									2	4	4	2								
10									1	2	2	1								
17									1	2	2	1								
24*									1	3	3	1								
Means..	0.1	0.4	1	3	6	10	16	20	24	27	27	25	22	16	12	7	4	2	0.6	0.1

* 8-day means.

TABLE 19.—*Mean hourly totals of solar and sky radiation on a horizontal surface, composite of 10 stations (Lincoln, Washington, New York, Blue Hill, Fresno, Riverside, Friday Harbor, Madison, Chicago, and La Jolla) in continental United States (apparent solar time)*

Week beginning—	Gram-calories per square centimeter for hour ending—																			
	A. M.								P. M.											
	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	12
Jan. 1				1.3	7.0	15.8	21.6	26.0	25.6	22.5	15.2	8.3	1.5							
8				1.3	7.6	16.1	22.9	26.7	26.7	23.9	17.4	8.3	1.6							
15				1.7	8.4	16.8	23.4	26.7	28.2	24.8	18.6	9.7	2.3							
22				2.4	11.3	21.3	28.7	33.0	33.3	29.0	22.0	12.4	3.0							
29				3.0	11.1	21.1	28.0	31.3	31.5	28.4	22.1	12.6	3.9							
Feb. 5				4.0	12.6	22.3	30.2	34.9	35.5	30.7	23.8	13.3	4.8							
12				5.0	14.2	24.2	31.5	34.8	35.6	32.5	25.0	15.5	5.8							
19			T	6.9	18.4	28.9	35.1	41.1	41.4	36.8	30.0	18.1	7.6	T						
26			1.2	9.8	20.5	31.9	41.1	46.2	46.2	41.4	37.7	22.2	10.1	1.5						
Mar. 5			1.5	9.4	22.5	33.3	42.9	46.8	45.4	41.9	33.9	23.4	11.9	2.0						
12			2.2	11.5	22.3	33.7	41.4	45.9	45.1	40.7	33.7	23.5	12.1	2.7						
19			3.4	13.7	25.4	36.6	45.1	49.5	50.3	45.6	38.3	27.0	15.2	4.3						
26			5.2	17.0	29.4	40.1	48.4	52.7	52.4	48.2	40.2	29.8	16.6	5.2						
Apr. 2		T	6.5	18.1	30.6	39.5	47.5	53.2	52.9	48.1	39.4	28.4	17.2	6.1	T					
9		0.8	7.1	18.5	30.7	42.6	50.8	54.5	54.1	49.4	41.3	32.1	19.2	7.3	0.8					
16		1.3	9.1	20.5	33.3	44.4	52.0	56.2	56.3	52.5	45.7	34.8	21.9	9.2	1.5					
23		1.9	10.1	22.9	35.0	46.2	54.8	58.7	59.6	54.7	46.6	35.5	22.0	10.0	1.9					
30		2.8	12.5	26.5	40.1	49.5	59.1	64.7	64.7	59.6	51.0	39.8	26.0	13.0	2.9					
May 7		3.2	13.4	25.5	38.8	49.5	58.8	62.7	61.4	57.8	49.8	38.8	25.5	13.2	3.3					
14		4.3	14.0	26.9	39.6	51.0	59.0	62.0	63.6	58.2	50.7	40.1	26.8	14.0	4.0					
21	T	4.8	15.8	28.9	40.9	52.3	60.5	64.5	64.2	61.4	53.7	42.8	28.9	15.4	4.6	T				
28	T	5.0	15.8	28.6	41.6	53.4	60.5	64.9	65.6	60.8	53.7	42.7	30.0	16.8	5.4	T				
June 4	0.4	5.6	16.7	30.0	43.0	54.4	62.8	69.1	67.7	63.6	54.4	43.8	30.8	18.0	5.7	0.6				
11	.6	5.3	15.5	28.0	42.2	52.3	59.9	63.4	63.8	60.6	52.6	41.8	28.9	16.6	5.8	.6				
18	.6	5.9	17.4	29.7	42.8	54.1	61.6	66.2	66.5	62.2	53.9	43.4	32.4	17.7	6.2	.7				
25	.7	5.4	15.9	28.3	41.4	53.1	61.0	65.2	64.3	60.1	52.5	42.1	29.5	16.9	5.9	.7				
July 2	.7	5.4	17.0	32.3	44.0	55.8	65.0	69.2	69.4	65.2	56.0	43.3	31.9	17.8	5.9	.7				
9	.3	5.3	16.6	30.4	43.8	55.6	61.0	67.8	67.8	63.7	55.1	43.0	29.6	16.6	5.6	.4				
16	T	4.8	16.3	29.0	42.2	54.7	60.7	66.3	65.6	61.5	54.9	42.3	28.8	15.6	5.1	T				
23	T	4.0	14.5	27.0	40.2	51.2	59.4	63.8	65.5	56.5	51.9	40.7	27.7	14.7	4.3	T				
30		3.2	13.8	27.3	41.0	52.8	61.6	64.6	66.3	61.6	52.6	41.7	28.7	14.8	3.8					
Aug. 6		2.7	11.7	23.4	36.9	49.2	57.9	63.0	63.3	59.1	50.5	39.9	26.4	12.8	2.8					
13		1.9	10.8	23.0	36.6	48.6	58.2	62.6	63.2	58.8	53.1	40.0	25.3	11.8	2.3					
20		1.5	10.2	22.9	36.5	48.8	56.3	61.0	61.1	56.0	47.8	36.5	23.7	9.9	1.7					
27		1.0	8.3	20.5	34.2	46.2	54.5	58.4	58.4	52.9	44.9	34.2	21.2	8.0	1.4					
Sept. 3		.6	7.3	21.2	33.5	45.5	54.2	59.6	59.3	54.9	44.7	33.3	19.3	7.1	.7					
10		T	5.8	17.6	30.1	40.5	50.1	55.6	54.5	49.0	41.1	28.8	16.2	5.2	T					
17			4.1	16.5	29.0	40.5	48.4	53.8	52.9	47.2	38.9	27.6	14.8	4.1						
24			3.2	13.4	24.7	34.1	43.5	48.7	49.1	43.7	36.1	24.7	12.4	2.9						
Oct. 1			2.5	11.8	24.5	34.7	43.2	48.3	48.5	43.5	36.7	23.3	11.3	1.8						
8			1.8	11.2	22.5	34.1	42.8	44.9	46.0	41.6	33.6	22.2	10.2	2.1						
15			1.4	9.2	21.9	31.8	40.5	41.0	43.9	38.9	29.6	18.3	7.0	.7						
22			.4	7.0	18.0	27.4	35.1	39.0	39.3	35.6	26.7	16.8	5.9	.2						
29				5.4	15.2	25.3	33.3	36.4	36.6	32.6	24.8	15.0	4.7							
Nov. 5				4.0	13.5	23.3	31.6	35.8	35.5	32.5	24.8	13.9	4.3							
12				3.9	13.3	23.1	30.3	33.7	33.6	28.9	20.7	11.1	2.2							
19				3.1	11.7	21.1	27.7	31.2	30.9	26.4	18.9	9.8	2.2							
26				2.1	10.1	19.6	26.9	30.2	30.3	25.5	17.8	9.1	1.6							
Dec. 3				1.8	8.6	15.8	22.4	26.4	25.7	22.1	16.0	7.7	1.4							
10				1.3	7.2	14.9	21.8	25.7	25.5	22.7	15.3	7.4	1.0							
17				1.3	7.4	14.8	21.5	25.4	24.7	21.4	15.0	6.8	.9							
24*				1.4	7.7	15.8	22.6	26.7	26.0	22.5	15.7	7.8	1.3							
Means..	.1	1.5	6.3	15.1	26.2	36.7	44.6	48.9	48.9	44.6	37.0	26.4	15.3	6.5	1.6	.1				

* 8-day means.

TABLE 20.—*Percentage departures of mean of maximum and minimum from annual mean*

Station	Latitude	Annual mean	Mean of maximum and minimum	Percentage of departures of mean maximum and minimum weeks from annual mean	Maximum	Minimum
	° ′					
Fairbanks	64 52	226	266.0	+17.7	536	6
Friday Harbor	48 32	331	373.5	+11.3	683	64
Madison	43 05	343	356.5	+3.9	598	105
Twin Falls	42 29	375	384.5	+2.5	651	118
Blue Hill	42 17	343	362.5	+5.7	608	117
Chicago	41 47	273	274.5	+0.5	476	73
Lincoln	40 50	376	378.5	+0.7	609	148
New York	40 46	304	328.5	+8.1	556	101
Washington	38 56	341	341.5	+0.1	557	126
Fresno	36 43	466	432.5	−7.2	733	132
Riverside	33 58	410	404.0	−1.5	604	204
La Jolla	32 50	416	413.0	−0.7	607	219
New Orleans	29 56	369	360.5	−2.3	542	179
Miami	25 41	392	399.5	+1.9	511	288
San Juan	18 28	520	497.0	−4.4	669	325

TABLE 21.—*Analysis of the isopleths*

Station	N. latitude	Maximum		Minimum		Symmetry	Average daily radiation	
		Noon. Week beginning—	Daily. Week beginning—	Noon. Week beginning—	Daily. Week beginning—		Gram-cal.	Departure from composite of continental United States
	° ′							*Percent*
San Juan	18 28	Feb. 26	Apr. 16	Jan. 1	Jan. 1	Very irregular; many crests	520	+44
Miami	25 41	Apr. 16	June 4	Sept. 23	Dec. 10, Dec. 24	Somewhat irregular; several crests	392	+9
New Orleans	29 56	June 11	June 18	Dec. 24	Dec. 24	Rather smooth	369	+2
La Jolla	32 50	Apr. 30	June 4	Dec. 10	Dec. 10	Fairly smooth; many crests	416	*+16
Riverside	33 58	June 11	June 11	do	do	Fairly smooth; few crests	410	*+14
Fresno	36 43	July 2	July 2	Dec. 17	Dec. 17	Very smooth; few crests	466	*+29
Washington	38 56	do	do	Dec. 10	Dec. 10	do	341	*−5
New York	40 46	do	do	Jan. 1	Jan. 1, Dec. 17	Irregular; many crests	304	*−16
Lincoln	40 50	do	do	Dec. 10	Dec. 10	Exceedingly smooth; only 1 crest	376	*+4
Chicago	41 47	July 9	do	Dec. 3	Dec. 3	Very smooth; few crests	273	*−24
Blue Hill	42 13	May 28, July 2	do	do	do	Rather irregular; many crests	343	*−5
Twin Falls	42 29	May 21, July 16	May 21	Dec. 24, Jan. 8	Dec. 24, Jan. 8	Very smooth; many crests	375	+4
Madison	43 05	July 2, July 23	July 9	Jan. 1, Jan. 8	Jan. 1	Fairly smooth	343	*−5
Friday Harbor	48 32	July 16	July 16	Dec. 17, Jan. 8	Dec. 24	Smooth; many crests	331	*−8
Fairbanks	64 52	June 11	June 11	Dec. 10, Dec. 17, Jan. 1	Dec. 10, Dec. 17, Jan. 1.	Irregular at noon; otherwise smooth	226	−33
Composite of 10 stations.	39 58	July 2	July 2	Dec. 17	Dec. 17	Very smooth	360	

*Stations included in the composite.

NOTES AND REVIEWS

Seventh Pacific Science Congress.—If world conditions permit, it is planned to hold the Seventh Pacific Science Congress at Manila in 1943, probably about November, under the auspices of the National Research Council of the Philippines. Father C. E. Deppermann, S. J., Assistant Director of the Philippine Weather Bureau, has been appointed Secretary for the section of meteorology and climatology.

Several symposia on subjects of general interest to the Pacific are being tentatively considered; and in addition, any papers contributing to the meteorology or climatology of the Pacific region will be welcomed.

The Secretary extends an invitation to American meteorologists and climatologists to attend this Congress and to contribute to the program. It is desired to make this Congress as representative of the whole Pacific region as possible, both north and south of the Equator. The Secretary will be glad to receive the names of those who plan to attend, titles of proposed papers, and suggestions as to symposia or other matters that may aid in making the Congress an outstanding success. Papers may be contributed even though the authors cannot attend in person.

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR APRIL 1941

[Climate and Crop Weather Division, J. B. KINCER in charge]

AEROLOGICAL OBSERVATIONS

By EARL C. THOM

Mean surface temperatures for April were above normal over nearly three-fourths of the country (chart I). Temperatures were below normal over western Texas, over most of the Plateau and Rocky Mountain region and, except for the coastal stations, over all of California, while temperatures were above normal over the rest of the country. An area including parts of three States, Arizona, Utah, and Nevada, had mean temperatures slightly more than 4° F. below normal while temperatures in the Great Lakes region were 6° to 8° above normal.

At 1,500 meters above sea level the 5 a. m. resultant winds were from directions to the south of normal over most of the country. The opposite turning from normal was noted, however, over Miami and El Paso, over most of the east central, the northeast and the upper Great Lake areas, as well as over parts of the north-central and northwestern sections. At the 3,000 m. level the directions of the 5 a. m. resultant wind were to the north of normal over most of the northeast and the northwest sections and to the south of normal elsewhere. A comparison could be made between the 5 p. m. resultant winds and the corresponding 5 a. m. normals for only about half of the stations of the country. The stations in the northeast and east-central portions of the country and most of those in the northwest and west-central areas reported 5 p. m. resultant directions to the north of the corresponding 5 a. m. normals for 5,000 meters while the opposite turning from these normals occurred at this level over the rest of the country.

At both the 1,500 m. and 3,000 m. levels the 5 a. m. resultant wind velocities were generally lower than normal. This negative departure was especially marked in the East Central States where the resultant velocities at these levels were from 4 to 6 m. p. s. below normal. At 5,000 meters most stations in the northern half of the country had 5 p. m. resultant velocities well below the corresponding 5 a. m. normals while the velocities to the south were generally above normal.

Except along the Gulf coast, the extreme Southeast and portions of the Northern Plateau region the 5 p. m. resultant winds were from directions to the south of the corresponding 5 a. m. resultants over the country generally, at the 1,500 m. level. This turning of the resultant winds to the southward during the day was generally true at 3,000 meters, there being only eight stations in the United States where the opposite shift in wind direction occurred.

At 1,500 meters the 5 p. m. resultant velocities were lower than the corresponding 5 a. m. normals over most stations in the eastern two-thirds of the country and were higher generally to the westward. Over the northern third of the country, the velocities of the 5 p. m. resultant winds

at 3,000 meters were lower than corresponding 5 a. m. velocities while an increase in these velocities during the day occurred generally to the southward.

The upper-air data discussed above are based on 5 a. m. (E. S. T.) pilot-balloon observations (charts VIII and IX) as well as on observations made at 5 p. m. (table 2 and charts X and XI).

At radiosonde and airplane stations in the United States proper the highest mean monthly pressure at each of the standard levels from 5,000 to 16,000 meters, inclusive, occurred over Brownsville, Tex. At the levels from 1,500 to 4,000 meters the maximum mean pressure for each level was recorded over two or more stations, while at 17,000 meters the highest mean pressure for the level (92 mb.), occurred over Brownsville, Miami, and San Antonio. At most of the standard levels from 1,500 to 9,000 meters the lowest mean pressure for the month was observed over both Bismarck and Spokane. At five of the standard levels from 10,000 to 15,000 meters the lowest mean pressure was observed over Spokane while at 13,000 meters a mean of 163 mb., the lowest for the level, was reported by both Great Falls and Spokane. At 16,000 meters six northern stations reported the same minimum pressure for the level. At the next level, 17,000 meters, five stations reported mean pressure of 74 mb., the lowest mean value for the level.

At each of the standard levels from 1,500 to 17,000 meters all Alaskan stations recorded pressures lower than the minimum mean pressures for the same levels over the United States while at San Juan pressures at each of the levels from 2,500 to 16,000 meters were higher than the corresponding maxima for the United States.

The mean monthly pressures at levels up to 3,000 meters were generally higher than those of last month over the eastern half of the country and lower than last month to the westward. At 5,000 meters and above, the pressures were higher than last month except that at the levels from 5,000 to 9,000 meters pressures were lower over an area in the Southwest and West Central States. The increase in mean pressures over those of last month was especially marked at the levels from 5,000 to 11,000 meters over the Great Lakes and over the New England States. At Portland, Maine, for example, the average of the mean pressures for these levels was about 16 mb. higher than the corresponding value for March. In Alaska mean pressures for April were either the same or higher than for March at all levels above 11,000 meters.

The largest difference between the maximum and minimum mean monthly pressure at any of the standard levels for stations in the United States was 21 mb. at both 8,000 and 10,000 meters. Steep pressure gradients appear from north to south on the pressure charts, especially at the levels from 7,000 to 11,000 meters. At both the 8,000 and 10,000 meter levels a change of 1 mb. is observed for each 61 miles of horizontal distance between Oklahoma City and Brownsville. This pressure gradient is somewhat steeper than the gradients further to the eastward, a change of 1 mb. in mean pressure, for example, being noted for each 75 miles of horizontal distance between Sault Ste. Marie and Nashville.

Temperatures were generally higher than last month at all levels below 10,000 meters at all stations of the country except at four stations in the Southwest and extreme West where temperatures were slightly lower at several of these levels. At levels above 10,000 meters mean temperatures for April were generally higher than last month in the western half of the country and generally lower to the eastward. At most Alaskan stations the mean temperatures were higher than last month, at Ketchikan however, temperatures were slightly lower at the levels from 5,000 to 9,000 meters but were higher at all other levels.

Comparison of the mean temperature charts for April 1941 with those for 1940 shows that temperatures from the surface to 3,000 meters were higher in April this year than last over the eastern half and over the northern third of the western half of the country and were lower than last year over the rest of the United States. At most levels from 5,000 to 11,000 meters temperatures for the month were higher than last year over the eastern two-thirds of the country and were lower to the westward. At levels above 13,000 meters the mean temperatures were higher than last year at most stations in the western two-thirds of the country and were generally lower to the eastward. At Juneau, Alaska, temperatures were lower than last year at levels below 3,000 meters and were higher than last year at all higher levels. At Fairbanks temperatures were lower than last year at levels up to and including 9,000 meters; were higher at the next four levels; and were lower than last year at 15,000 meters and above.

At the 1,000-meter level the free-air temperatures were higher than normal over most of the country. Temperatures were below normal, however, at this level over California. At 3,000 meters temperatures for the month were above normal over most of the southeast and over most of the northeast and north-central areas, and were below normal over the rest of the country. At 5,000 meters the temperatures were below normal over Denver and over all stations to the westward while, with three exceptions, temperatures were above normal over all stations east of Denver.

At the 1,000-, 3,000- and 5,000-meter levels the relative humidities were above normal over most stations. The mean relative humidities were below normal, however, over Portland, Maine, and Sault Ste. Marie at all three of these levels, while the relative humidity was also below normal at 3,000 meters over Lakehurst and at 1,000 meters over Nashville and Norfolk. There was no clearly defined connection between the April charts for departure from normal relative humidity for these levels and the chart of departure from normal precipitation for the month.

The altitude, at which the monthly mean temperature of 0° C occurred, varied from 1,900 meters (m. s. l.) over Sault Ste. Marie to 4,400 meters over Brownsville. Over the southwest and west-central region the level of average freezing conditions during the month was slightly lower than the corresponding level of last month and was higher over all other stations of the country.

The lowest temperature recorded in the free air over the United States was −79.8° C (−111.6° F) recorded on April 4 at a height of 16,300 meters (about 10 miles) over Miami, Fla. A lower temperature, −87.1° C (−124.8° F) was recorded, however, at 18,200 meters over San Juan on April 3.

Table 3 shows the maximum free air wind velocities and their directions for various sections of the United States during April as determined by pilot-balloon observations. The highest wind velocity reported for the month was 75.0 meters per second (168 m. p. h.) observed over Big Spring, Tex. on April 16. This wind was blowing from the WSW, at an elevation of 10,950 meters.

The highest wind velocities observed in April during the last 5 years occurred this year in the layer from the surface to 2,500 meters and also in the layer from 2,500 m. to 5,000 m. (table 3). A wind of 85.0 m. p. s., the maximum April wind velocity for 5 years, however, was recorded in 1940 for the upper-air layer above 5,000 meters. This wind was recorded on April 22, 1940, blowing from the SW. at a height of 14,670 meters over Redding, Calif.

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by airplanes and radiosondes during April 1941*

Altitude (meters) m. s. l.	Stations with elevations in meters above sea level																							
	Anchorage, Alaska (41 m.)				Albuquerque, N. Mex. (1,620 m.)				Atlantic Station No. 1[3] (3 m.)				Atlantic Station No. 2[4] (3 m.)				Atlanta, Ga. (300 m.)				Barrow, Alaska (6 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	998	5.5	68	29	835	8.4	53	27	1015	14.8	73	30	1017	14.8	82	30	983	14.3	76	30	1,020	−17.3	91
500	30	943	3.3	67	----	----	----	----	27	957	10.6	77	30	958	10.8	87	30	960	15.7	69	30	955	−16.5	83
1,000	30	887	−0.3	68	----	----	----	----	27	901	7.5	77	30	902	7.8	87	30	906	13.7	66	30	894	−13.2	73
1,500	30	832	−4.3	72	----	----	----	----	27	848	5.2	72	30	849	6.6	77	30	853	10.4	63	30	836	−12.6	66
2,000	30	781	−8.2	77	29	797	6.3	53	27	797	3.0	68	30	799	4.3	70	30	803	7.7	59	30	783	−13.5	62
2,500	30	732	−11.6	78	29	749	2.8	55	27	749	.7	63	30	751	2.2	63	30	755	4.9	58	30	733	−15.8	61
3,000	30	686	−14.9	78	29	704	−1.2	59	27	703	−1.8	55	30	705	−.5	57	30	710	2.4	54	30	686	−18.3	60
4,000	30	600	−21.7	77	28	620	−8.3	62	26	619	−8.0	49	30	622	−6.3	50	30	627	−3.5	49	30	599	−24.3	57
5,000	30	523	−28.5	76	27	544	−15.3	60	26	543	−14.7	45	30	546	−12.6	45	30	551	−10.1	44	30	521	−30.7	56
6,000	30	454	−35.2	75	27	476	−21.9	56	26	475	−21.8	43	28	478	−19.6	44	30	484	−16.9	40	30	452	−37.7	55
7,000	30	392	−42.2	----	26	414	−28.7	53	26	414	−29.1	42	28	418	−26.5	44	29	422	−23.7	39	30	390	−44.7	----
8,000	30	338	−48.3	----	26	359	−35.7	49	26	359	−36.3	43	26	362	−33.9	44	29	367	−31.2	37	30	335	−50.5	----
9,000	30	290	−52.2	----	26	310	−42.6	----	26	310	−42.7	----	26	313	−41.3	----	29	318	−38.4	36	30	287	−53.3	----
10,000	30	248	−52.3	----	24	267	−48.9	----	24	267	−48.7	----	26	270	−48.7	----	29	275	−45.6	----	29	246	−51.2	----
11,000	30	213	−50.7	----	23	229	−53.3	----	24	228	−53.0	----	26	231	−55.1	----	29	236	−52.0	----	28	211	−48.8	----
12,000	30	182	−49.2	----	23	196	−55.5	----	24	195	−55.8	----	26	197	−58.9	----	29	202	−56.9	----	25	182	−47.6	----
13,000	29	157	−48.7	----	22	167	−55.4	----	24	167	−56.4	----	26	168	−58.8	----	26	172	−58.8	----	23	156	−47.7	----
14,000	28	134	−48.8	----	22	143	−56.2	----	23	142	−55.4	----	26	143	−57.5	----	26	147	−59.7	----	21	134	−48.2	----
15,000	27	116	−49.2	----	22	122	−57.2	----	22	122	−55.6	----	25	122	−58.3	----	24	125	−61.2	----	20	115	−48.7	----
16,000	24	99	−49.6	----	22	104	−58.4	----	21	104	−56.6	----	24	104	−59.8	----	24	106	−63.1	----	18	99	−49.1	----
17,000	24	85	−50.2	----	21	89	−59.8	----	19	88	−56.9	----	22	89	−59.7	----	21	90	−63.2	----	11	85	−49.3	----
18,000	18	73	−50.9	----	18	75	−59.6	----	14	76	−56.8	----	17	76	−59.6	----	19	77	−62.7	----	7	73	−49.9	----
19,000	13	62	−51.5	----	11	64	−58.9	----	10	64	−56.6	----	8	64	−59.1	----	13	65	−61.9	----	5	62	−50.3	----
20,000	5	54	−52.3	----	----	----	----	----	----	----	----	----	----	----	----	----	7	55	−60.5	----	----	----	----	----

Altitude (meters) m. s. l.	Stations with elevations in meters above sea level																							
	Bethel, Alaska (7 m.)				Bismarck, N. Dak. (505 m.)				Brownsville, Tex. (6 m.)				Buffalo, N. Y. (221 m.)				Charleston, S. C. (14 m.)				Coco Solo, C. Z.[1] (15 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	28	999	0.9	81	30	955	5.6	84	30	1,011	20.6	92	30	993	6.5	76	30	1,017	15.2	87	25	1,012	26.9	87
500	28	940	−.7	77	----	----	----	----	30	955	19.4	86	30	960	8.7	69	30	950	16.3	68	25	957	24.3	90
1,000	28	883	−3.1	78	30	899	5.2	77	30	901	18.5	73	30	903	6.6	63	30	905	13.5	67	25	903	21.5	81
1,500	28	828	−6.1	80	30	845	3.0	76	30	850	17.1	64	30	850	3.9	61	30	853	10.6	66	25	852	18.7	77
2,000	28	777	−9.1	78	30	794	0.5	77	30	802	15.0	59	30	798	1.5	59	30	803	7.5	63	25	804	16.1	72
2,500	28	728	−12.	75	30	746	−2.3	78	30	755	12.6	53	30	750	−0.8	56	30	755	5.3	56	25	758	13.7	64
3,000	28	682	−15.3	73	30	701	−5.4	75	30	712	10.1	50	29	704	−3.4	53	30	710	2.4	51	25	714	11.4	50
4,000	28	596	−22.0	68	30	616	−11.8	65	28	630	3.5	48	29	620	−9.3	48	30	627	−3.4	47	17	633	5.2	49
5,000	27	520	−28.8	61	30	540	−18.6	60	28	556	−3.8	49	29	544	−15.8	45	30	552	−9.5	45	----	----	----	----
6,000	27	451	−36.0	59	30	471	−25.4	57	28	490	−11.3	50	29	475	−22.6	43	30	484	−15.9	41	----	----	----	----
7,000	27	389	−43.0	----	30	409	−32.4	54	27	429	−18.4	49	29	414	−29.8	42	30	423	−22.3	40	----	----	----	----
8,000	27	335	−48.3	----	30	354	−39.9	50	27	375	−25.6	47	29	359	−37.8	40	30	369	−29.9	38	----	----	----	----
9,000	27	288	−51.7	----	30	305	−47.4	----	27	325	−32.8	46	29	310	−45.3	----	30	319	−38.0	38	----	----	----	----
10,000	27	246	−50.5	----	29	262	−53.6	----	26	282	−40.0	----	29	266	−52.0	----	30	276	−45.9	----	----	----	----	----
11,000	27	212	−48.1	----	28	225	−56.5	----	25	243	−46.9	----	29	228	−57.2	----	30	237	−53.1	----	----	----	----	----
12,000	27	182	−47.1	----	28	192	−55.6	----	24	208	−53.2	----	29	194	−58.8	----	30	202	−57.7	----	----	----	----	----
13,000	25	156	−47.4	----	28	164	−54.0	----	24	178	−58.9	----	29	166	−58.2	----	30	173	−60.0	----	----	----	----	----
14,000	23	134	−47.6	----	28	140	−53.5	----	24	152	−63.4	----	28	142	−56.9	----	30	147	−61.1	----	----	----	----	----
15,000	23	116	−47.9	----	26	120	−54.0	----	23	129	−66.7	----	25	121	−56.6	----	30	125	−62.0	----	----	----	----	----
16,000	22	99	−48.5	----	23	103	−54.8	----	22	109	−69.9	----	23	103	−57.1	----	28	106	−63.9	----	----	----	----	----
17,000	19	85	−48.8	----	21	88	−55.7	----	19	92	−71.2	----	22	88	−57.6	----	26	90	−65.2	----	----	----	----	----
18,000	13	73	−49.5	----	16	75	−56.1	----	17	78	−68.8	----	17	75	−57.7	----	24	77	−65.4	----	----	----	----	----
19,000	6	62	−50.3	----	7	64	−57.0	----	9	66	−65.6	----	10	64	−58.0	----	17	65	−64.1	----	----	----	----	----
20,000	----	----	----	----	----	----	----	----	----	----	----	----	5	54	−57.8	----	14	55	−61.7	----	----	----	----	----
21,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	46	−59.7	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by airplanes and radiosondes during April 1941*—Continued

Altitude (meters) m. s. l.	Stations with elevations in meters above sea level																							
	Denver, Colo. (1,616 m.)				El Paso, Tex. (1,193 m.)				Ely, Nev. (1,908 m.)				Fairbanks, Alaska (156 m.)				Great Falls, Mont. (1,128 m.)				Joliet, Ill. (178 m.)				Juneau, Alaska (49 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	834	4.9	76	30	879	13.9	40	30	805	0.6	82	30	985	4.4	53	30	885	6.1	63	27	996	7.9	81	30	1,006	6.2	85
500													30	945	3.0	54					27	958	9.5	75	30	952	3.9	81
1,000													30	888	0.3	55					27	902	7.9	69	29	895	0.4	85
1,500					30	847	13.5	39					30	834	−3.0	59	30	846	5.9	60	27	848	5.1	69	28	840	−2.3	85
2,000	30	795	3.8	73	30	798	10.3	40	30	796	1.5	78	30	782	−6.7	62	30	795	2.2	60	27	797	2.3	70	28	789	−5.4	82
2,500	30	748	0.7	71	30	751	6.4	41	30	748	−0.7	73	30	733	−10.4	63	30	747	−1.6	62	27	749	−0.6	68	27	740	−8.2	81
3,000	30	702	−2.6	72	30	706	2.8	40	30	703	−4.4	72	30	687	−13.8	64	30	701	−5.2	66	27	704	−3.1	64	24	693	−10.9	77
4,000	30	618	−9.6	72	29	624	−4.4	43	30	618	−11.7	71	30	601	−20.8	64	30	617	−11.5	68	26	620	−8.8	57	20	608	−16.9	69
5,000	29	542	−16.7	70	29	548	−11.1	43	30	542	−18.8	66	30	525	−27.7	62	30	541	−18.0	64	26	544	−15.2	49	18	531	−22.8	63
6,000	27	474	−24.1	64	29	481	−18.0	38	30	473	−26.0	62	30	456	−34.8	62	30	472	−25.0	60	26	476	−22.1	46	17	462	−29.5	63
7,000	27	412	−31.6	60	29	420	−24.9	35	30	410	−33.6	60	30	394	−41.6	----	30	410	−32.4	57	26	414	−29.1	44	14	400	−36.4	----
8,000	27	357	−39.7	58	29	365	−32.4	33	30	355	−41.2	----	30	340	−47.9	----	30	355	−40.5	----	26	360	−36.7	----	13	344	−43.2	----
9,000	26	308	−47.1	----	29	316	−40.1	----	30	306	−47.8	----	28	291	−52.6	----	30	306	−48.5	----	25	310	−44.1	----	12	296	−49.2	----
10,000	26	264	−52.5	----	27	273	−47.5	----	30	262	−52.6	----	27	249	−52.7	----	30	263	−56.0	----	25	267	−51.1	----	10	253	−51.1	----
11,000	25	226	−54.6	----	27	234	−53.8	----	30	225	−55.0	----	26	214	−50.7	----	30	224	−59.4	----	25	229	−56.2	----	10	217	−51.0	----
12,000	23	193	−55.4	----	27	200	−57.6	----	30	192	−54.4	----	26	183	−49.1	----	30	191	−56.8	----	25	195	−57.8	----	7	185	−51.4	----
13,000	22	165	−54.6	----	26	170	−58.0	----	29	164	−53.2	----	24	157	−48.5	----	29	163	−54.2	----	25	166	−56.4	----	6	158	−48.8	----
14,000	19	141	−54.4	----	26	145	−58.8	----	29	141	−53.5	----	23	135	−48.5	----	28	140	−53.9	----	25	142	−55.5	----	5	136	−47.6	----
15,000	18	120	−54.8	----	26	124	−60.5	----	28	120	−54.9	----	22	116	−49.0	----	28	120	−53.8	----	24	122	−55.3	----	5	117	−48.8	----
16,000	15	103	−55.8	----	26	105	−63.3	----	26	103	−55.8	----	20	99	−49.6	----	27	102	−54.3	----	22	104	−55.9	----	5	100	−48.4	----
17,000	14	88	−56.2	----	24	89	−63.6	----	23	88	−56.6	----	15	85	−50.2	----	24	88	−54.7	----	20	89	−56.3	----	5	86	−47.5	----
18,000	10	75	−55.9	----	21	76	−62.7	----	15	75	−56.4	----	12	73	−50.8	----	17	75	−54.9	----	14	76	−56.5	----	5	74	−46.8	----
19,000					18	64	−60.7	----	6	64	−57.0	----					9	64	−55.0	----	7	64	−56.4	----	5	63	−47.6	----
20,000					5	54	−61.1	----																				

Altitude (meters) m. s. l.	Stations with elevations in meters above sea level																							
	Ketchikan, Alaska (26 m.)				Lakehurst, N. J.[1] (39 m.)				Medford, Oreg. (401 m.)				Miami, Fla. (4 m.)				Nashville, Tenn. (180 m.)				Nome, Alaska (14 m.)				Norfolk, Va.[1 2] (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	27	1,011	8.1	75	30	1,014	7.0	79	29	967	9.6	70	28	1,016	20.0	85	30	996	14.7	71	30	1,003	−1.8	72	21	1,020	12.8	80
500	27	954	5.9	75	30	959	9.1	66	29	955	10.8	69	28	960	18.3	84	30	959	15.3	66	30	944	−3.3	73	21	962	15.8	53
1,000	27	898	2.5	75	30	903	7.3	64	29	899	8.3	67	28	905	16.0	72	30	904	12.5	66	30	886	−5.2	72	31	907	12.8	48
1,500	27	844	−0.8	76	30	850	4.7	62	29	846	4.8	70	28	854	13.3	67	30	852	9.2	68	30	831	−7.2	70	21	854	9.5	49
2,000	27	792	−3.5	71	30	799	2.1	61	29	795	1.3	71	28	803	10.6	64	30	802	6.1	68	30	779	−9.8	67	21	804	6.3	52
2,500	27	743	−6.1	65	30	750	−0.6	59	29	747	−1.9	71	28	757	8.5	54	30	754	3.8	62	30	730	−12.8	65	21	756	2.8	55
3,000	27	697	−9.1	60	30	705	−3.1	55	29	701	−5.1	69	28	712	6.3	46	30	709	1.2	60	30	683	−16.2	63	21	711	0.0	50
4,000	27	611	−15.3	56	30	620	−8.6	51	29	617	−11.1	60	28	630	0.8	39	30	626	−4.8	54	29	597	−22.7	59	21	626	−5.5	41
5,000	27	535	−21.9	55	30	544	−14.8	56	29	541	−18.5	56	27	555	−5.2	40	30	550	−11.3	49	29	520	−20.4	54	17	550	−11.6	36
6,000	27	466	−28.8	52	29	476	−21.3	59	29	472	−25.8	55	26	488	−12.1	40	30	482	−18.1	48	29	451	−36.7	54	----	----	----	----
7,000	25	404	−36.0	51	29	415	−28.6	60	29	410	−33.5	54	26	428	−19.0	40	29	421	−25.2	46	29	390	−43.5	----	----	----	----	----
8,000	23	349	−43.6	----	29	360	−36.3	59	29	355	−41.0	----	26	373	−26.1	40	29	366	−32.5	45	29	335	−49.4	----	----	----	----	----
9,000	22	300	−50.2	----	29	311	−44.5	----	29	305	−47.7	----	26	324	−33.5	40	28	317	−40.0	46	28	288	−52.9	----	----	----	----	----
10,000	20	257	−54.6	----	29	268	−51.4	----	29	262	−52.8	----	26	281	−41.3	----	28	273	−47.1	----	27	246	−51.5	----	----	----	----	----
11,000	18	220	−57.3	----	29	229	−56.4	----	29	225	−55.2	----	26	242	−48.6	----	28	235	−53.1	----	27	212	−49.2	----	----	----	----	----
12,000	17	188	−57.5	----	28	195	−59.0	----	29	192	−56.0	----	26	207	−54.7	----	28	201	−57.5	----	27	182	−48.1	----	----	----	----	----
13,000	16	160	−54.6	----	26	166	−58.5	----	28	164	−54.5	----	26	177	−59.0	----	27	171	−59.7	----	27	156	−47.9	----	----	----	----	----
14,000	13	137	−53.0	----	25	142	−57.5	----	28	140	−54.2	----	26	151	−63.1	----	25	146	−59.2	----	25	134	−47.9	----	----	----	----	----
15,000	11	117	−52.8	----	23	121	−57.7	----	26	120	−54.1	----	26	128	−67.2	----	25	124	−60.0	----	24	115	−48.1	----	----	----	----	----
16,000	10	100	−52.9	----	20	103	−58.1	----	23	102	−54.7	----	26	108	−70.0	----	23	106	−61.6	----	19	99	−48.3	----	----	----	----	----
17,000	6	86	−53.1	----	13	88	−58.7	----	22	87	−55.1	----	24	92	−70.8	----	19	90	−62.0	----	11	85	−48.6	----	----	----	----	----
18,000					7	74	−58.8	----	13	74	−55.3	----	21	77	−68.8	----	16	77	−61.0	----	10	73	−49.3	----	----	----	----	----
19,000									5	63	−55.1	----	17	65	−65.3	----	14	65	−60.4	----	6	62	−50.1	----	----	----	----	----
20,000													12	55	−62.4	----	7	56	−60.0	----					----	----	----	----
21,000													7	46	−59.9	----									----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by airplanes and radiosondes during April 1941*—Continued

Stations with elevations in meters above sea level

Altitude (meters) m. s. l.	Oakland, Calif. (2 m.)				Oklahoma City, Okla. (391 m.)				Omaha, Nebr. (301 m.)				Pearl Harbor, T. H.[1 2] (7 m.)				Pensacola, Fla.[1 2] (24 m.)				Phoenix, Ariz. (339 m.)				Portland, Maine (19 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	1,015	12.0	80	30	968	13.7	78	30	979	11.1	74	30	1,017	20.5	81	28	1,016	19.0	83	30	972	13.6	70	30	1,015	5.2	72
500	30	956	9.8	77	30	956	14.6	75	30	956	10.7	73	30	961	19.3	74	28	961	17.2	74	30	954	17.2	55	30	957	7.7	58
1,000	30	900	8.6	64	30	901	13.2	66	30	900	9.0	71	30	907	16.3	78	28	906	15.1	69	30	899	14.4	49	30	900	4.9	58
1,500	30	847	5.7	58	30	848	10.6	64	30	847	7.2	65	30	855	13.5	74	28	854	12.4	63	30	847	10.4	49	30	847	2.0	59
2,000	30	797	2.7	52	30	799	7.6	62	30	797	4.2	63	30	806	11.7	63	28	804	9.9	56	30	797	6.4	51	30	796	0.0	56
2,500	30	748	−0.6	49	30	751	5.0	57	30	749	1.1	62	30	758	11.2	39	28	756	7.6	50	30	749	2.7	51	30	747	−2.5	53
3,000	30	702	−3.8	48	30	706	1.8	55	30	704	−1.6	60	30	714	10.2	27	27	712	5.1	44	30	704	−1.0	51	30	701	−5.0	52
4,000	30	618	−10.3	44	30	623	−4.5	52	30	620	−8.0	57	30	632	6.0	17	27	629	−0.8	42	30	621	−7.9	52	30	617	−10.4	53
5,000	30	542	−16.9	42	30	548	−11.3	47	28	544	−14.9	54					24	554	−7.2	47	30	545	−14.0	49	30	541	−16.6	49
6,000	30	473	−24.3	41	30	480	−18.2	42	27	476	−21.9	51					19	486	−13.7	46	30	477	−20.5	47	30	473	−22.7	47
7,000	30	412	−31.6	40	30	419	−25.9	41	27	415	−29.3	49					18	425	−21.2	46	29	416	−27.7	46	30	412	−30.4	45
8,000	30	357	−38.5	39	29	364	−33.4	40	27	360	−37.2	49					15	370	−28.7	45	29	361	−35.0	45	29	357	−38.3	46
9,000	30	308	−44.9	----	29	315	−41.1	----	27	310	−44.8	----					14	321	−36.1	----	29	312	−42.0	----	28	308	−46.3	----
10,000	30	265	−50.7	----	29	271	−48.1	----	27	267	−51.5[3]	----					12	277	−43.8	----	29	269	−48.3	----	28	264	−53.6	----
11,000	27	226	−54.1	----	29	233	−53.8	----	26	228	−56.1	----					8	238	−51.7	----	28	231	−52.9	----	28	226	−57.6	----
12,000	26	194	−55.0	----	29	199	−57.5	----	26	195	−58.2	----					8	203	−58.8	----	27	197	−55.1	----	28	193	−57.3	----
13,000	23	166	−54.5	----	29	170	−57.9	----	24	166	−57.8	----					6	172	−64.4	----	25	169	−54.3	----	28	164	−56.9	----
14,000	23	142	−54.4	----	28	145	−58.3	----	24	142	−56.8	----					5	145	−67.3	----	24	144	−55.1	----	24	140	−56.1	----
15,000	20	121	−55.1	----	28	123	−59.5	----	23	121	−57.1[4]	----									22	123	−57.3[4]	----	22	120	−56.7	----
16,000	18	103	−55.7	----	26	105	−60.7	----	19	103	−57.9[4]	----									20	105	−59.2[4]	----	19	102	−58.1	----
17,000	15	88	−56.0	----	22	89	−61.5	----	16	88	−58.3	----									19	89	−59.7[4]	----	12	87	−58.1	----
18,000	11	75	−55.6	----	19	76	−61.4	----	12	75	−57.9	----									15	76	−59.7[4]	----	10	74	−57.9	----
19,000					13	64	−60.1	----	9	64	−58.0	----									9	64	−59.3[4]	----				
20,000					5	55	−58.3	----																				

Stations with elevations in meters above sea level

Altitude (meters) m. s. l.	St. Louis, Mo. (171 m.)				St. Paul, Minn. (225 m.)				St. Thomas, V. I.[1 2] (8 m.)				San Antonio, Tex. (174 m.)				San Diego, Calif.[1 2] (19 m.)				San Juan, P. R. (15 m.)				Sault S. Marie, Mich. (221 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	996	12.9	76	30	989	9.2	77	26	1,016	26.9	71	30	993	17.8	84	28	1,012	15.5	79	26	1,013	24.3	81	30	992	3.9	78
500	30	958	12.3	75	30	956	9.2	74	26	961	22.8	91	30	956	17.6	82	28	955	12.0	74	26	958	22.0	81	30	959	5.7	74
1,000	30	902	10.0	72	30	900	7.2	73	26	907	19.4	84	30	902	15.7	77	28	900	9.4	66	26	905	18.7	80	30	902	4.0	67
1,500	30	849	7.1	70	30	847	4.7	74	26	856	16.4	79	30	850	14.0	69	28	847	7.2	57	26	853	15.7	77	30	848	1.7	64
2,000	30	799	4.3	67	30	796	2.2	70	26	806	14.9	65	30	801	11.7	62	28	797	4.2	50	26	804	13.8	68	30	797	−0.2	62
2,500	30	751	1.2	63	30	748	−0.5	68	26	760	13.7	52	30	754	9.3	57	28	749	0.9	51	26	758	11.9	58	30	748	−2.7	60
3,000	30	705	−1.8	61	30	702	−3.2	63	26	716	11.4	45	30	710	6.9	51	27	703	−2.3	54	26	713	9.4	49	30	702	−5.2	55
4,000	30	621	−7.7	57	30	618	−9.1	56	26	635	5.8	44	30	628	0.6	45	26	619	−7.7	48	26	632	4.0	43	29	617	−10.8	48
5,000	29	546	−14.0	56	30	543	−15.8	53	----	----	----	----	30	554	−6.1	39	25	544	−13.4	37	26	558	−1.7	37	29	541	−17.1	43
6,000	28	478	−20.8	53	30	474	−22.8	49	----	----	----	----	30	486	−13.2	36	25	476	−20.2	39	26	492	−7.9	32	29	473	−24.1	42
7,000	27	416	−28.1	50	30	413	−29.9	48	----	----	----	----	30	426	−20.7	35	25	415	−28.0	38	26	432	−14.5	29	29	411	−31.7	41
8,000	26	361	−35.7	48	30	358	−37.6	47	----	----	----	----	30	371	−27.7	34	24	360	−35.2	----	25	377	−21.4	28	28	356	−39.6	40
9,000	26	312	−43.2	----	29	309	−45.0	----	----	----	----	----	30	322	−35.0	34	24	311	−41.8	----	25	328	−28.3	28	28	307	−47.2	----
10,000	26	268	−50.3	----	28	266	−52.0	----	----	----	----	----	30	279	−42.5	----	24	268	−46.8	----	24	286	−35.8	28	28	264	−53.7	----
11,000	26	230	−56.4	----	28	228	−56.9	----	----	----	----	----	30	240	−49.8	----	24	230	−52.8	----	24	247	−43.4	----	28	226	−57.9	----
12,000	24	196	−59.3	----	26	194	−57.2	----	----	----	----	----	30	205	−55.3	----	21	197	−55.0	----	22	212	−50.2	----	27	192	−58.7	----
13,000	24	167	−59.0	----	25	166	−55.5	----	----	----	----	----	30	175	−58.3	----	18	168	−55.7	----	20	182	−57.6	----	26	164	−56.5	----
14,000	23	142	−57.7	----	23	142	−54.1	----	----	----	----	----	29	149	−60.6	----	16	144	−56.4	----	19	155	−64.5	----	25	140	−55.3	----
15,000	21	121	−57.6	----	23	121	−54.7	----	----	----	----	----	28	127	−62.8	----	14	123	−57.0	----	18	131	−70.4	----	25	119	−55.2	----
16,000	19	104	−58.6	----	20	104	−55.9	----	----	----	----	----	28	108	−65.4	----	14	105	−58.2	----	15	111	−75.4	----	21	102	−55.7	----
17,000	17	89	−59.1	----	14	89	−56.5	----	----	----	----	----	26	92	−66.5	----	9	89	−59.9	----	15	92	−75.8	----	17	87	−55.9	----
18,000	13	76	−59.3	----	8	76	−56.7	----	----	----	----	----	20	78	−65.2	----	----	----	----	----	11	78	−72.5	----	10	74	−56.2	----
19,000	7	64	−59.2	----	6	65	−56.8	----	----	----	----	----	12	66	−64.2	----	----	----	----	----	9	66	−67.4	----	5	63	−56.2	----
20,000													5	56	−62.2	----					6	56	−61.3	----				

See footnotes at end of table.

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by airplanes and radiosondes during April 1941*—Continued

Altitude (meters) m. s. l.	Stations with elevations in meters above sea level												Late report for March 1941			
	Seattle, Wash.[1] (27 m.)				Spokane, Wash. (598 m.)				Washington, D. C. (5 m.)				Swan Island, W. I. (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	1,012	10.5	77	30	942	8.5	71	29	1,018	12.2	68	31	1,013	24.8	76
500	29	956	9.7	69					29	960	12.8	62	31	958	21.1	83
1,000	29	900	6.7	67	30	898	9.1	62	29	904	10.5	60	31	904	18.0	79
1,500	28	847	3.3	68	30	845	5.7	60	29	851	7.5	58	31	853	15.7	68
2,000	28	796	−0.1	70	30	794	2.0	60	29	801	4.6	58	31	804	14.0	60
2,500	28	747	−3.1	67	30	746	−1.8	61	29	753	1.7	59	31	757	11.9	56
3,000	28	701	−6.1	66	30	701	−5.5	64	29	707	−1.1	61	31	713	9.3	50
4,000	28	616	−12.5	63	30	616	−12.7	66	28	623	−6.9	56	31	632	5.6	40
5,000	28	540	−19.3	65	30	539	−19.3	62	27	548	−13.1	52	31	559	−0.2	34
6,000	28	471	−26.7	63	30	471	−26.1	57	26	479	−20.4	51	31	492	−6.7	29
7,000	28	410	−33.6	61	30	409	−33.7	54	25	418	−27.6	49	31	432	−12.6	28
8,000	28	355	−41.2	----	29	354	−41.5	----	24	362	−35.3	47	31	378	−19.8	27
9,000	28	306	−48.4	----	29	305	−49.1	----	23	313	−43.2	----	31	329	−27.4	26
10,000	27	262	−54.6	----	29	261	−55.8	----	21	269	−50.5	----	31	287	−34.6	25
11,000	27	224	−59.1	----	29	223	−58.4	----	20	230	−55.6	----	29	248	−42.5	----
12,000	26	192	−59.3	----	29	190	−57.7	----	20	197	−57.5	----	29	213	−50.6	----
13,000	26	164	−57.5	----	29	163	−54.7	----	19	168	−56.8	----	29	182	−58.6	----
14,000	24	140	−56.2	----	29	139	−53.9	----	18	143	−57.2	----	25	155	−66.2	----
15,000	22	120	−55.5	----	28	119	−53.8	----	16	122	−57.0	----	24	131	−73.3	----
16,000	20	102	−55.6	----	27	102	−54.4	----	14	104	−57.6	----	24	110	−79.9	----
17,000	14	87	−55.6	----	22	87	−54.6	----	10	89	−58.4	----	23	92	−82.6	----
18,000	10	74	−55.7	----	14	74	−54.6	----	10	76	−58.2	----	20	77	−78.5	----
19,000	6	62	−56.0	----	11	64	−54.8	----	5	65	−58.3	----	15	65	−73.0	----
20,000	----	----	----	----	----	----	----	----	----	----	----	----	11	54	−68.4	----
21,000	----	----	----	----	----	----	----	----	----	----	----	----	7	46	−64.5	----
22,000	----	----	----	----	----	----	----	----	----	----	----	----	5	39	−59.9	----

[1] U. S. Navy.
[2] Airplane observations.
[3] Observations made on Coast Guard vessels in or near the 5° square:
Lat. 35°00′ N. to 40°00′ N.
Long. 55°00′ W. to 60°00′ W.
[4] Observations made on Coast Guard vessels in or near the 5° square:
Lat. 35°00′ N. to 40°00′ N.
Long. 45°00′ W. to 50°00′ W.
[5] Radiosonde and airplane observations.

NOTE.—All observations taken at 12:30 a. m. 75th meridian time, except at Lakehurst, N. J., where they are taken at or near 5 a. m., E. S. T., at Norfolk, Va., where they are taken at about 6 a. m., and at Pearl Harbor, T. H., after sunrise.

None of the means included in this table are based on less than 15 surface or 5 standard level observations.

Number of observations refers to pressure only as temperature and humidity data are missing for some observations at certain levels; also, the humidity data are not used in daily observations when the temperature is below −40.0° C.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations maden ear 5 p. m. (75th meridian time) during April 1941. Directions given in degrees from North (N=360°, E=90°, S=180°, W=270°)—Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (537 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (866 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (18 m.)			Chicago, Ill. (192 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	28	176	3.2	30	226	2.2	30	196	0.5	29	24	2.5	28	38	1.3	28	330	2.9	30	121	4.4	30	278	1.0	30	320	2.3	27	152	2.1	27	134	0.2	30	250	0.9	30	159	1.4
500							30	211	1.1										29	132	5.2	30	268	2.3	30	315	4.1	27	161	2.5	27	154	1.0	30	246	1.7			
1,000	28	188	4.0				30	224	1.4				28	32	0.8	28	324	2.7	21	152	2.1	29	268	3.6	30	312	4.7	25	242	1.9	27	203	3.4	30	223	2.0			
1,500	27	201	4.0				28	243	1.7	29	34	2.8	22	213	0.9	28	323	2.3	16	280	2.2	26	264	4.3	28	302	5.1	25	277	2.9	21	214	3.3	28	230	4.0			
2,000	23	216	3.8	30	246	4.5	25	237	2.9	29	24	1.0	19	210	4.2	28	313	2.1	15	278	3.7	24	281	5.6	26	294	5.6	23	268	2.6	20	214	4.3	26	236	5.2	30	130	0.8
2,500	18	235	7.8	30	256	4.5	24	246	2.7	29	328	1.4	14	218	4.5	26	334	0.9	13	259	6.4	22	295	6.3	22	310	6.2	22	276	3.0	18	222	5.2	25	251	6.1	28	180	1.6
3,000	17	244	10.3	29	238	5.7	22	254	4.0	23	290	2.5	10	242	2.5	22	58	1.6	12	264	9.0	22	302	7.0	18	323	7.6	20	261	4.3	16	240	5.2	24	256	6.2	27	209	2.1
4,000	16	248	15.6	24	252	9.6	20	274	7.1	21	302	2.8				15	21	1.4	10	270	14.7	19	315	8.0	10	321	7.0	14	270	8.0	13	254	5.5	19	268	4.7	22	242	5.1
5,000	13	256	19.3	18	250	14.1	15	274	8.8	18	311	3.9				15	334	1.9				18	319	8.4							12	265	7.1	13	301	3.3	12	240	8.7
6,000	13	261	22.6	15	251	17.1	12	278	12.2	16	316	3.7				14	353	3.3				16	329	9.7							11	276	6.0	11	297	5.0	10	250	9.3
8,000				10	263	24.1	10	292	15.2	12	331	6.1				14	341	3.6				13	311	12.0															
10,000																12	338	5.5				10	338	13.5															

Altitude (meters) m. s. l.	El Paso, Tex. (1,196 m.)			Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (14 m.)			Las Vegas, Nev. (570 m.)			Little Rock, Ark. (79 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (10 m.)			Minneapolis, Minn. (265 m.)			Mobile, Ala. (9 m.)			Nashville, Tenn. (194 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	29	259	3.2	29	288	0.8	30	262	1.1	26	243	1.1	28	86	2.2	30	91	3.2	30	160	1.8	29	138	2.1	28	328	1.1	29	91	3.0	30	164	1.9	30	170	3.8	29	211	1.7
500										26	225	1.1				30	101	2.5				29	149	3.4	28	313	1.4	29	105	3.5	30	152	3.2	30	149	4.8	29	210	2.0
1,000										25	247	2.0	28	82	2.4	26	115	1.4	30	196	1.4	28	170	3.9	28	289	1.9	27	129	2.2	27	166	4.9	29	136	3.5	29	225	2.5
1,500	29	253	3.1				30	258	1.2	25	254	2.6	28	78	1.4	26	203	1.2	30	202	2.2	25	198	4.5	27	259	1.9	24	148	1.0	26	185	6.8	29	121	1.4	28	220	3.4
2,000	29	246	4.1	29	297	0.9	30	271	1.6	24	285	3.7	27	10	0.7	25	254	2.4	30	219	1.9	25	213	5.6	27	218	2.2	24	58	0.2	21	195	7.1	25	348	0.9	28	238	4.3
2,500	28	252	6.7	29	266	1.1	29	258	1.8	24	289	5.3	26	348	1.2	24	265	2.5	27	250	1.9	23	225	6.6	23	216	2.6	22	249	0.9	16	180	6.6	25	303	1.9	26	254	4.5
3,000	26	251	8.2	27	252	1.3	28	219	3.0	22	292	5.2	23	330	1.3	24	270	3.7	27	257	2.5	19	241	5.6	23	228	2.0	22	277	2.2	10	221	5.7	24	281	4.6	24	258	6.0
4,000	22	246	16.2	18	249	1.5	19	215	3.9	21	292	6.2	19	357	1.2	21	286	5.9	26	253	5.2	13	270	9.9	21	259	0.4	21	294	5.5				21	278	7.3	15	275	7.6
5,000	17	244	18.8	11	187	3.8	11	258	4.6	19	286	7.9	17	328	2.6	19	279	8.1	24	290	7.6	11	260	12.0	17	344	1.1	16	297	7.3				19	276	10.8	10	293	10.5
6,000	12	249	24.1							19	297	9.0	17	331	3.0	19	285	12.0	22	285	9.9				16	339	5.9	15	294	9.5				15	280	14.8			
8,000										12	317	8.5				14	286	18.5	17	293	20.4				12	332	9.7	14	293	15.7									
10,000																13	297	25.2	14	289	22.3				12	328	12.6												
12,000																			11	279	18.0																		

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th, meridian time) during April 1941. Directions given in degrees from North (N=360°, E=90°, S=180°, W=270°)—Velocities in meters per second*—Continued

Altitude (meters) m. s. l.	New York, N. Y. (15 m.)			Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			San Antonio, Tex. (180 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, Mich. (230 m.)			Seattle, Wash. (14 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (10 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	28	233	1.0	29	243	3.8	27	159	2.3	26	178	2.5	30	263	1.7	28	338	2.9	26	147	0.8	27	104	2.7	27	277	4.3	28	232	1.9	29	271	1.5	29	216	0.9	29	237	0.8
500	28	260	3.1	29	266	2.8	27	173	2.7	26	190	2.8	30	244	2.8	---	---	---	26	186	2.0	27	110	3.9	27	290	3.6	28	235	1.5	29	260	1.7	---	---	---	29	300	1.0
1,000	28	286	4.5	28	296	2.4	27	166	4.7	25	187	5.3	30	233	3.6	28	339	2.9	26	216	3.3	22	118	2.7	21	294	2.5	23	212	1.9	28	242	2.4	29	223	0.9	29	283	1.8
1,500	28	306	6.4	24	321	2.7	27	187	4.6	23	201	6.9	30	240	4.2	28	328	2.9	23	218	4.9	18	176	1.6	17	288	3.3	23	241	2.4	27	212	3.1	29	212	1.0	28	276	3.3
2,000	24	315	8.4	23	325	3.0	26	223	5.1	21	221	6.2	30	240	4.5	24	272	1.5	21	236	4.7	14	262	3.6	16	290	3.5	22	260	2.2	23	190	4.2	28	210	1.5	27	287	5.4
2,500	23	318	8.1	23	325	2.8	23	243	7.1	19	223	7.6	29	252	3.5	18	241	3.6	21	242	5.1	12	264	5.6	15	300	4.5	21	261	2.6	22	181	4.3	23	233	0.8	26	288	7.1
3,000	20	316	9.2	22	316	3.9	20	249	9.7	15	230	7.6	28	260	4.7	14	220	5.6	17	244	5.9	---	---	---	14	311	5.3	19	286	3.8	19	174	4.9	22	160	0.1	24	299	8.9
4,000	---	---	---	21	328	5.4	15	253	11.8	11	235	5.7	22	260	8.4	12	223	6.8	17	256	7.6	---	---	---	---	---	---	17	299	3.6	15	153	2.5	19	72	1.9	20	307	10.4
5,000	---	---	---	20	326	7.7	10	252	14.4	11	241	6.8	21	265	13.2	10	226	9.7	14	278	10.0	---	---	---	---	---	---	16	315	3.4	12	347	2.0	18	108	1.9	18	307	9.9
6,000	---	---	---	17	331	10.5	---	---	---	---	---	---	16	270	15.7	---	---	---	13	281	12.8	---	---	---	---	---	---	15	316	7.5	11	358	3.9	16	96	1.3	16	322	9.5
8,000	---	---	---	14	341	18.6	---	---	---	---	---	---	10	280	28.7	---	---	---	10	282	19.0	---	---	---	---	---	---	12	315	13.4	---	---	---	11	29	3.3	10	314	11.1
10,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	343	1.4	---	---	---
12,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	275	3.2	---	---	---

TABLE 3.—*Maximum free air wind velocities, (m. p. s.), for different sections of the United States, based on pilot-balloon observations during April 1941*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	41.0	WNW	2,460	14	Pittsburgh, Pa.	60.4	W	4,240	22	Boston, Mass.	65.0	WSW	10,300	1	Portland, Maine.
East-Central [2]	37.0	WSW	2,230	20	Louisville, Ky.	45.0	WSW	3,930	21	Elkins, W. Va.	54.0	NW	10,300	26	Louisville, Ky.
Southeast [3]	28.9	ESE	1,000	7	Birmingham, Ala.	38.0	WSW	3,700	4	Mobile, Ala.	67.0	WNW	10,150	1	Jacksonville, Fla.
North-Central [4]	39.8	SSW	2,110	20	Milwaukee, Wis.	31.9	WSW	2,870	11	Rapid City, S. Dak.	46.8	SW	9,440	12	Rapid City, S. Dak.
Central [5]	37.6	SSW	1,100	13	Des Moines, Iowa.	45.6	SW	4,470	13	Dodge City, Kans.	61.6	WSW	10,140	20	Wichita, Kans.
South-Central [6]	37.0	W	1,390	6	Big Spring, Tex.	53.6	S	4,210	19	Dallas, Tex.	75.0	WSW	10,950	16	Big Spring, Tex.
Northwest [7]	36.8	E	260	4	Tatoosh, Wash.	34.0	N	4,650	13	Spokane, Wash.	50.0	NW	10,690	7	Medford, Oreg.
West-Central [8]	36.0	W	2,480	13	Cheyenne, Wyo.	39.1	SW	2,840	14	Winnemucca, Nev.	68.0	NW	13,590	7	Redding, Calif.
Southwest [9]	36.6	NW	2,500	6	Albuquerque, N. Mex.	45.4	NW	2,780	6	Albuquerque, N. Mex.	69.9	WNW	10,420	6	Las Vegas, Nev.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except extreme west Texas), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

WEATHER ON THE NORTH ATLANTIC OCEAN

By H. C. HUNTER

Atmospheric pressure.—During April 1941, the portions of the North Atlantic Ocean which are well covered by reports at hand had pressure mostly below normal, as has been the case during each month of 1941 so far. The deficiency was greatest, on the average, over the southeastern part of the ocean. Near the North American coast, from the Gulf of St. Lawrence to the waters east of the Carolinas, the pressure averaged somewhat above normal.

The extremes of pressure in available vessel reports were 1,036.2 and 988.8 millibars (30.60 and 29.20 inches). The high mark was noted late on the 24th by the Coast Guard cutter *Bibb*, near 38° N., 44° W. Pressure had been almost as high over waters adjacent to southern New England, the Middle Atlantic States, and the Carolinas during the 13th and the latter part of the 12th. The low reading was reported by the American steamship *Carrillo*, about midnight of the 1st-2d, near 37½° N., 71° W. Marks closely approaching the *Carrillo's* were noted during the final 2 days of the month near the coast of Portugal.

Cyclones and gales.—The month seems to have been about as stormy as an average April, but the especially high winds were limited to the early and late portions of the month almost exclusively, the period from the 9th to 26th having scarcely any gales, according to reports so far received.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (seal level) at selected stations for the North Atlantic Ocean and its shores, April 1941*

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Lisbon, Portugal	1,012.4	−3.2	1,023	6	998	29
Horta, Azores	1,019.0	−2.0	1,028	10, 25	1,006	6
Belle Isle, Newfoundland	1,010.9	−1.3	1,030	25, 27	986	1
Halifax, Nova Scotia	1,017.0	+3.5	1,032	26	1,003	1
Nantucket	1,017.3	+2.4	1,032	12	1,001	6
Hatteras	1,018.3	+2.0	1,029	13	1,000	1
Turks Island	1,016.1	−0.5	1,021	16	1,008	30
Key West	1,015.6	−1.0	1,024	14	1,008	5
New Orleans	1,015.9	0.0	1,025	14	1,002	3

NOTE.—All data based on available observations, departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

Two portions of the month as already noted had particularly low pressure readings—the first 2 and the final 2 days. However, the only known occurrences of winds of force greater than 10 were connected with neither of these, but occurred during the daylight hours of the 5th over waters to eastward of the Carolinas, as shown in the table of gales accompanying. The LOW connected with these winds was centered over Indiana on the morning of the 5th, but was of wide extent, its

eastern edge covering waters somewhat to eastward of the coast from New Jersey to below Hatteras. On the following morning the center was about 100 miles to southward of Nantucket, whence it moved rapidly onward toward the east-northeast.

Fog.—As the spring advances there is normally a marked increase in amount of fog reported, and this year the increase from March to April was very noteworthy, especially over the northern Gulf of Mexico and near the United States coast between Capes Hatteras and Cod. The portion of the gulf where fog was most frequent was the square 25° to 30° N., 85° to 90° W., with 8 days of occurrence, none of these being later than the 21st.

The western North Atlantic square with most days of fog was that from 35° to 40° N., 70° to 75° W., where the count was 12, distributed through the month. Well to the southward, between the Bahamas and Bermuda, some fog was seen on the 18th and 19th; over these waters fog is of rare occurrence.

Fog was noted on several dates, especially about the middle of the month, nearly midway between Bermuda and the western Azores, while a few occurrences were reported between the Azores and Portugal.

In comparison with the Aprils of past years April of 1941 is found to have had very much more than normal fogginess over the northern Gulf of Mexico and somewhat more than normal over waters adjacent to the Middle Atlantic States.

OCEAN GALES AND STORMS, APRIL 1941

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
North Atlantic Ocean			° ′	° ′				*Millibars*					
Carrillo, Am. S. S.	Boston	New Orleans	37 30 N.	71 00 W.	1	12p, 1	2	988.8	SE.	SE, 8	NW.	SE, 8	SE-W.
Mayari, Pan. S. S.	Banes	Boston	34 42 N.	71 30 W.	2	7a, 2	2	1,000.3		W, 7		NW, 8	W-NW.
Hamilton, U. S. C. G.	On Station No. 1		38 42 N.	59 30 W.	2	2p, 2	3	993.2	SSE.	SSW, 9	WSW.	SSW, 10	SSE-NW.
Bibb, U. S. C. G.	Norfolk	Station No. 2	38 00 N.	68 00 W.	2	5p, 2	3	989.8	SW.	S, 10	WSW.	WSW, 10	S-WSW.
West Lashaway, Am. S. S.	Freetown	Boston	[1] 38 20 N.	66 21 W.	2	8p, 3	3	1,013.5	SW.	N, 7	N	W, 9	
General Greene, U. S. C. G.	On ice patrol		44 48 N.	45 12 W.	3	9p, 3	3	1,000.0		NNE, 8		NNE, 8	
Hamilton, U. S. C. G.	On Station No. 1		38 42 N.	59 06 W.	4	10p, 3	4	997.0	N.	WNW, 3	NNW.	NNW, 8	SW-N.
Excalibur, Am. S. S.	Lisbon	Bermuda	36 00 N.	51 00 W.	4	10a, 4	4	995.3	WSW.	WSW, 8	WNW.	WNW, 8	S-WNW.
Bibb, U. S. C. G.	Norfolk	Station No. 2	38 54 N.	49 24 W.	4	2p, 4	5	993.6	NNW.	E, 1	NNW.	NW, 8	E-WSW.
Spencer, U. S. C. G.	On Station No. 2		39 00 N.	46 00 W.	3	5p, 4	3	991.5	S.	WSW, 5	WSW.	S, 8	SSW-NNW.
Santa Ana, Am. S. S.	New York	Cristobal	35 25 N.	74 14 W.	5	2p, 5	5	995.6	S.	SSW, 6	NW.	S, 8	S-NW.
Seatrain New Jersey, Am. S. S.	do	Texas City	[1] 36 15 N.	74 37 W.	5	3p, 5	5	999.7	W.	S, 6	W.	W, 8	S-W-WSW.
A vessel	do	Cristobal	[1] 34 53 N.	73 58 W.	5	4p, 5	5	[2] 1,008.8	ESE.	SW, 4	SSE.	S, 11	SSE-NNW-SSW.
Ewa, Am. S. S.	do	do	32 54 N.	74 06 W.	5	4p, 5	5	1,002.0	SSE.	SSW, 6	SSW.	SSE, 9	SSE-SW.
Gulfcrest, Am. M. S.	do	La Cruz, Venez.	35 54 N.	71 42 W.	5	7p, 5	5	999.7	SE.	SSW, 9	SSW.	SE, 11	SSE-SSW.
Montgomery City, Am. S. S.	Cristobal	Boston	38 00 N.	71 00 W.	5	4a, 6	7	1,000.0	SE.	W, 3	NE.	NE, 10	NNE-W.
Spencer, U. S. C. G.	Station No. 2	New York	38 54 N.	63 36 W.	6	4p, 6	7	994.9	SW.	WSW, 5	NNE.	NE, 9	SW-NW.
Hamilton, U. S. C. G.	On Station No. 1		38 30 N.	59 06 W.	6	2a, 7	7	992.6	SSE.	WSW, 8		SSW, 9	SW-NW.
General Greene, U. S. C. G.	On ice patrol		[1] 42 34 N.	47 02 W.	7	2p, 7	7	993.6	SW.	S, 10	WSW.	S, 10	S-NE.
Bibb, U. S. C. G.	On Station No. 2		38 12 N.	45 48 W.	7	4a, 8	8	1,005.1	S.	S, 8	S.	S, 10	
Mormacyork, Am. M. S.	Trinidad	New York	[1] 35 07 N.	71 06 W.	8	4a, 8	8	1,013.2	NNE.	NNE, 7	NE.	NNE, 8	N-NNE.
Duane, U. S. C. G.	On Station No. 1		39 18 N.	60 12 W.	12	4p, 12	12	1,018.6	N.	N, 8	N.	N, 8	None.
Bibb, U. S. C. G.	On Station No. 2		38 54 N.	46 00 W.	19	3p, 19	19	1,011.5	SW.	SW, 7	SW.	SW, 8	SW-WNW.
Clare, Am. S. S.	Jacksonville	Baltimore	33 06 N.	77 00 W.	22	1a, 22		1,019.3		W, 2		NNE, 8	SW-NW.
Pan Massachusetts, Am. S. S.	Galveston	Boston	41 06 N.	69 18 W.	26	4a, 27	27	1,009.8	NE.	NE, 8	NNE.	NE, 8	
Bibb, U. S. C. G.	Station No. 2	Norfolk	37 36 N.	63 54 W.	27	9a, 27	28	1,008.5	S.	SW, 7	NW.	NNW, 9	SSW-W.
Exhibitor, Am. S. S.	Trinidad	Boston	39 18 N.	68 42 W.	27	2a, 28	28	1,007.5	NW.	NNW, 8	NNW.	NW, 8	NW-NNW.
A. S. Hansen, Am. S. S.	Smith's Bluff, Tex.	Carteret, N. J.	26 12 N.	88 00 W.	28	12m, 28	28	1,015.2	E.	E, 8	E.	E, 8	
Spencer, U. S. C. G.	On Station No. 2		39 00 N.	46 00 W.	28	3p, 29	29	1,002.0	S.	W, 5	SW.	S, 8	SW-WNW.
North Pacific Ocean													
West Cusseta, Am. M. S.	Yokohama	Vancouver, B. C.	42 30 N.	153 30 E.	1	11a, 1	1	1,002.0		WNW, 8	WNW.	WNW, 8	
Dellwood, Am. S. S.	Seattle	Dutch Harbor	52 40 N.	151 00 W.	1	6p, 1	2	980.7	SSE.	SE, 8	N.	SE, 9	SE-E.
F. J. Luckenbach, Am. S. S.	Portland, Oreg.	San Francisco	43 54 N.	124 30 W.	2	4p, 2	2	1,003.1	S.	S, 7	SSE.	SSW, 8	SE-S.
A vessel	Zamboanga, P. I.	Los Angeles	38 24 N.	149 12 W.	2	12p, 2	3	993.7	WSW.	W, 10	WNW.	W, 11	WSW-WNW.
Diamond Head, Am. S. S.	St. Helens, Oreg.	Hilo	36 30 N.	138 30 W.	3	8a, 3	4	1,000.0	SSW.	SSW, 8	W.	W, 8	SSW-W.
West Cusseta, Am. M. S.	Yokohama	Vancouver, B. C.	45 29 N.	162 47 E.	3	3p, 3	4	983.7	ENE.	N, 9	NW.	NW, 11	ENE-NW.
Waimea, Am. S. S.	San Francisco	Honolulu	35 21 N.	129 21 W.	4	8p, 3	4	1,005.8	W.	S, 7	WNW.	W, 8	S-SW.
J. A. Moffett, Am. S. S.	Richmond, Calif.	Pt. Wells, Wash.	43 10 N.	124 57 W.	3	6p, 4	5	992.9	SSE.	SW, 8	W.	SSW, 9	SSW-WSW.
West Cusseta, Am. M. S.	Yokohama	Vancouver, B. C.	[1] 49 54 N.	168 33 W.	8	6a, 8	8	995.3	W.	SSE, 4	W.	W, 10	SSE-SW.
President Buchanan, Am. S. S.	Hong Kong	San Francisco	31 48 N.	157 30 E.	8	10p, 9	9	1,014.6		NW, 8		NW, 8	WNW-NNW.
President Pierce, Am. S. S.	San Francisco	Yokohama	42 48 N.	135 18 W.	9	3p, 9	9	1,003.7	NW.	WSW, 4	NW.	NW, 9	WSW-NW
Meigs, U. S. A. T.	Singapore	Los Angeles	40 38 N.	175 00 E.	9	1a, 10	10	971.9	SE.	W, 8	W.	W, 10	SE-W.
Manulani, Am. S. S.	San Francisco	Honolulu	36 30 N.	126 42 W.	10	4a, 10	10	1,005.1	WNW.	W, 5	NW.	WNW, 10	W-WNW.
West Cusseta, Am. M. S.	Yokohama	Vancouver, B. C.	50 22 N.	155 15 W.	9	12m, 10	11	991.2	SE.	SSW, 8	SW.	SSW, 10	S-SW.
Matsonia, Am. S. S.	San Francisco	Honolulu	37 33 N.	123 00 W.	11	8p, 11	12	1,003.4	NW.	NW, 7	NNW.	NNW, 9	NW-NNW.
Baranof, Am. S. S.	Seattle	Seward	59 06 N.	141 18 W.	14	9a, 13	14	1,008.1		SSW, 6		SSE, 8	
Irwin L. Hunt, U.S.A.T.	Honolulu	San Francisco	37 45 N.	122 42 W.	15	8p, 15	15	1,017.6	NNW.	NNW, 8	NNW.	NNW, 8	
President Buchanan, Am. S. S.	Hong Kong	do	41 41 N.	155 00 W.	14	9p, 15	15	1,004.1	SE.	SE, 10	ESE.	SE, 10	ESE-SE.
Swiftsure Bank Lightship, U. S.	On station		48 33 N.	125 00 W.	14	4p, 14	16	1,014.2	W.	W, 6	W.	W, 8	None.
Makua, Am. S. S.	Honolulu	San Francisco	37 30 N.	123 48 W.	15	2a, 16	16	1,025.1	N.	N, 9		N, 9	
Neches, U. S. S.	Dutch Harbor	Kodiak	55 30 N.	156 30 W.	17	6p, 17	17	1,008.1	NNE.	NE, 8	NE.	NE, 8	NE-ENE.
Kamakura Maru, Jap. M. S.	San Francisco	Honolulu	36 48 N.	125 30 W.	17	10p, 17	18	1,019.5		NNW, 8	NNW.	NNW, 8	
Tuscaloosa City, Am. S. S.	Honolulu	Balboa	13 54 N.	101 18 W.	25	5p, 24	25	1,007.8	ESE.	N, 4	NE.	ENE, 7	N-E.
Satartia, Am. S. S.	Catabangan, P. I.	Los Angeles	[1] 41 18 N.	175 31 W.	28	4a, 28	28	993.6	SW.	SW, 3	WNW.	WNW, 9	

[1] Position approximate.

[2] Barometer uncorrected.

WEATHER ON THE NORTH PACIFIC OCEAN

By WILLIS E. HURD

Atmospheric pressure.—On an average, there were two great centers of pressure activity on the North Pacific Ocean during April 1941. The more important feature was the abnormally deep Aleutian LOW which, fed by a succession of higher latitude cyclonic depressions, attained an average depth of 996.8 millibars (29.44 inches), at Dutch Harbor. This value is 11.7 millibars (0.34 inch) below the normal of the month. Pressure was very low as far east as Kodiak, but from Juneau southward to Mazatlan, barometer means were only slightly below normal. In waters off central California, owing to the movements of several disturbances, pressure was moderately low for the month, the average at San Francisco being 3.0 millibars (0.09 inch) below the normal. The North Pacific anticyclone was central in the general vicinity of Midway Island, where the mean barometer, 1,021.9 millibars (30.18 inches), was 1.9 millibars (0.06 inch) above the normal. In the extreme southwestern part of the ocean, the spring condition of low pressure, following the warming up of the adjacent land surface, was beginning to appear.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Pacific Ocean and its shores, April 1941.*

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Barrow	1,020.4	+1.8	1,039	18	1,009	7
Dutch Harbor	996.8	−11.7	1,022	17	975	11
St. Paul	1,000.5	−8.3	1,025	17	984	22
Kodiak	998.7	−8.8	1,018	17	982	7
Juneau	1,012.5	−2.1	1,033	16	995	4
Tatoosh Island	1,015.2	−0.7	1,026	17	994	4
San Francisco	1,014.6	−3.0	1,025	16	998	10
Mazatlan	1,011.4	−0.8	1,013	1, 7, 15, 16, 26	1,008	24
Honolulu	1,017.6	−0.4	1,024	1	1,012	22
Midway Island	1,021.9	+1.9	1,027	6	1,015	22
Guam	1,011.1	−1.1	1,015	3, 7	1,009	17, 25, 26
Manila	1,009.8	0.0	1,014	1, 8	1,008	14, 15, 19, 24, 26
Hong Kong	1,012.2	+0.3	1,022	6	1,005	25
Naha	1,014.6	+1.4	1,024	7, 8	1,009	20
Titijima	1,016.0	+1.1	1,025	3	1,007	23
Petropavlovsk	1,009.9	+0.8	1,027	19	986	4

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—At the close of March a disturbance of some intensity was causing stormy weather over the eastern third of the California-Hawaiian routes. On the 1st and 2d of April the disturbance moved northward with lessened intensity, and a cyclone from the Aleutian region, traveling rapidly in a general southeasterly direction, lay on the 3d and 4th off the northwest coast of the United States. As a result of the two LOWS, fresh to strong westerly to southerly gales were experienced by coastwise steamers off Oregon and southern Washington during the 2d to 4th, while farther southwestward, between California and the Hawaiian Islands, westerly winds of force 8 occurred on the 3d and 4th. The strongest wind due to the storm was a west gale of force 11 experienced during the early morning of the 3d, near 38° N., 149° W.

On April 9 a further cyclone appeared to the westward of Oregon, causing local gales, with the highest reported of force 9, near 43° N., 135° W. The storm lay close off the coast on the 10th. The highest wind observed in connection with it on that date was of force 10, reported by the American S. S. *Manulani*, in 36°30′ N., 126°42′ W. On the 11th the cyclone entered California, but as late as the morning of the 12th strong winds occurred along the coast, the American S. S. *Matsonia* reporting a northwesterly gale of force 9 a few hours out from San Francisco.

On the 15th to 18th strong winds, at times attaining gale strength, again disturbed our west coast. Off northwestern Washington the higher winds, of force 8, were from the west, but off the middle California coast, they were northwest to north. The strongest wind reported at sea was from the north, of force 9, experienced on the 16th by the American S. S. *Makua*, in 37°30′ N., 123°48′ W. These winds occurred on the eastern slope of the oceanic HIGH, then abutting upon the continent.

In middle Pacific longitudes known gales were few. The stormiest period was about the 8th to 10th, with gales, apparently localized, rising at times to force 10. On the 10th and 11th a cyclone of considerable depth extended from the Bering Sea to the southward of the 40th parallel, and on the 10th the U. S. A. T. *Meigs* had a west gale of force 10 and the lowest barometer reading reported for the month, 971.9 millibars (28.70 inches), near 41° N., 175° E. Much farther eastward on that day the American M. S. *West Cusseta* had a southwesterly gale of force 10, connected with the same storm, near 50° N., 155° W.

Early in the voyage of the M. S. *West Cusseta* from the Orient toward Vancouver, on April 3, the vessel entered a cyclone to the eastward of the Kuril Islands. From about 6 p. m. of the 3d to about 8 a. m. of the 4th, and beginning near 45° N., 163° E., she was under the influence of northwesterly winds of force 11, lowest barometer 983.7 millibars (29.05 inches). This condition of storminess was by far the most important reported by ships during the month from the extreme western part of the ocean.

Fog.—Very few reports of fog were received. Among the most interesting was one from a vessel that encountered fog on the 21st northeast of the Ogasawara (Bonin) Islands and did not entirely leave the fog area until the 24th, near 36° N., 161° E. On the 28th fog was observed near 40° N., 170° W., and on the 8th to 13th, over a region extending southwestward from about 40° N., at 133° W., to 33° N., at 157° W. The occurrences were on the 8th to 10th on the western half of the region, and on the 11th to 13th, on the eastern half. The only near-coastal fog reported was on the 27th, west of Washington.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

The precipitation pattern during April followed quite closely the trend of previous months, the eastern part of the country and the far northwest being quite dry while from the central Mississippi Valley westward and southwestward precipitation was generally above normal. Temperatures were well above normal over all sections except the far southwest.

Excessive rains occurred in Arkansas, southwestern Missouri, southeastern Kansas, and eastern Oklahoma during the middle of April. Flooding was severe locally in this area and in the main reaches of the Osage, Gasconade, and Neosho Rivers. Six lives were reported lost due to flooding in the Ozarks region. Floods of less severity were experienced in the lower reaches of the Missouri and Arkansas Rivers, and in the White River.

River stages were high in the upper Mississippi River with flooding in northern Minnesota and stages slightly above flood stage in the Mississippi River from Keokuk, Iowa, to Louisiana, Mo. Slight flooding occurred in some of the streams in the eastern Carolinas. Stages continued high in Texas, the Southwest, and in the Sacramento Basin with some flooding.

Stages were still unusually low in most of the Ohio Basin but some rains occurred during the month and slight flooding was reported in parts of Tennessee and Kentucky.

Atlantic Slope drainage.—The volume of spring run-off in most of New England was unusually small. A long period of clear weather with low humidity and scanty precipitation, accompanying the persistence of polar air masses over that area, resulted in a rapid depletion of the snow cover by evaporation. Also, the early season snow cover prevented the usual depth of frost penetration and caused considerable early losses of snow to ground water.

At Concord, N. H., the precipitation for the period March 12 to April 17, when the peak stage in the Merrimack River occurred, totalled only 0.52 inch. The greatest 24-hour rainfall during this period was 0.24 inch on March 17. The highest stage at Concord was 6.5 feet (flood stage 12 feet) on April 17.

A slow and steady rise began in the Connecticut River early in April and continued at Hartford, Conn., until the 17th, the rise being due entirely to melting snow. Flood stage was exceeded only at South Newbury, Vt., from the 16th to the 20th where a stage of 20.8 was reached on April 18.

A moderate rise occurred gradually during the first week in April in the Delaware River due to the run-off from melting snow aided by a moderately heavy rain on the 5th–6th. Flood stages were not reached and by the close of the month stages had receded to below normal for the season.

Heavy rain over the upper Susquehanna River Basin on April 5 brought rising stages to above flood stage on the 6th and 7th. The stages had been rising from the melting of considerable snow in the wooded areas and on northern slopes. Flood stages were reached or slightly exceeded in all of the upper basin down to and including Wilkes-Barre, Pa., where a stage of 23.9 feet (flood stage 22 feet) was reached on April 7, but no appreciable damage occurred.

Moderate rises occurred in the Potomac and James Rivers from rains on April 5 but the only station to reach or exceed flood stage was Columbia, Va., on the James River, where a peak stage of 17.2 feet occurred on April 6. One or two stations on each of the Roanoke, Neuse, Cape Fear, Peedee, and Savannah Rivers reported stages above flood during this period but no damage resulted.

East Gulf of Mexico drainage.—In the Pearl River Basin a period of moderate rainfall during the first few days of April resulted in only moderate rises, while another period of moderate to heavy rainfall, occurring from the 20th–24th, resulted in minor flooding in the lower Pearl.

Upper Mississippi Basin.—Melting of snow coupled with moderate rains early in April in the extreme upper Mississippi Basin caused moderately high river stages in the Minneapolis-St. Paul area and flooding in the headwaters of the Mississippi River. A crest of 13.2 feet occurred at Minneapolis (flood stage 16 feet) on the 11th and 11.5 feet at St. Paul (flood stage 14 feet) on the 12th. The river, meanwhile, continued to rise in the upper reaches, aided by an extended period of rainfall from April 13–19, cresting at a stage of 14.7 feet at Aitken, Minn. (flood stage 12 feet), on April 22–23 and 10.1 feet at Fort Ripley, Minn. (flood stage 10 feet), on April 20. The peak stages from this rise were 13.3 feet at Minneapolis on April 22 and 11.0 feet at St. Paul on April 24. The maximum flow at La Crosse, Wis., at the peak stage of 10.9 feet was 81,600 second-feet on April 18.

Losses from the floods in this area were not great because no crops had been planted. Farm property losses above Minneapolis were estimated at $10,000 and losses in Aitken County to roads and bridges were estimated at $38,000. There was some flooding of the lowlands along the Mississippi from Red Wing, Minn., to La Crosse, Wis., with reported losses amounting to $13,000 in that area. Slight damages were caused in the Chippewa River and other tributaries in west central Wisconsin and southeastern Minnesota from high water in those streams.

Flood stage was exceeded in the main channel of the Mississippi also in the reach between Keokuk, Iowa, and Louisiana, Mo., from April 19 to the end of the month. No appreciable damage resulted.

Flooding occurred in the Bourbeuse and the Meramec Rivers in Missouri, draining into the Mississippi River below St. Louis, Mo. A discussion of this flooding will be given below in connection with rather severe floods which occurred in the Osage and Neosho Rivers.

Missouri, Arkansas, and White Basins.—A large anticyclone was centered over or slightly east of Florida from April 14 to 20 and resulted in a strong flow of warm moist tropical air northward over eastern Texas and eastern Oklahoma and thence northeastward over Missouri. Heavy rainfall occurred over Arkansas, eastern Oklahoma, southeastern Kansas, and southern and eastern Missouri. The amounts were exceedingly heavy over southwestern Missouri and adjoining sections of Oklahoma, Kansas, and Arkansas.

Floods were especially severe in the Osage, Gasconade, and Neosho Rivers where record or near record breaking stages occurred. Overflows occurred also in the Meramec, Bourbeuse, Cimarron, Verdigris, North Canadian, Poteau, White (in Arkansas), and lower Missouri and Arkansas Rivers but were less severe.

Stormy conditions, attended by heavy rains in southwest Missouri from the 14th to the 19th caused considerable damage to soil by overflow of creeks and other small streams, and resulted in six deaths. Only two deaths were due entirely to wind, and these in connection with a small tornado during the late evening of the 18th near Reeds Spring. Practically every small stream in southwest Missouri overflowed, and press reports indicate damages of somewhat more than a million dollars. The greatest damage was evidently to the secondary road systems operated by the counties and to farm lands that were badly eroded by the excessive rains. The water plant at Joplin was forced to close down by the flood, and heavy damage was suffered at Monett by the flooding of stores. Houses and mines in the Webb City-Oronogo district were overflowed and rendered useless, and much livestock was swept away. No estimates of damage include losses of private property owners, which undoubtedly was high; and the total damage over southwest Missouri must have been well over a million dollars.

The average amounts of precipitation over some of the drainage areas in Missouri for the 6-day period ending April 20, were as follows: Osage, 5.9 inches; Gasconade, 4.85 inches; Meramec, 4.1 inches; and lower Missouri, 4.4 inches.

In the Verdigris River Basin, rainfall amounts from April 13 to 19 ranged from 3.33 inches at Toronto, Kans., to 8.24 inches at Claremore, Okla. Precipitation over the Grand Lake area in Oklahoma from April 14 to 19, ranged from 7.62 inches at Jay to 10.44 inches at Spavinaw, while below Pensacola Dam stations reported amounts ranging from 2.51 inches at Sallisaw, Okla., to 10.4 inches at Pryor, Okla.

The crest stages for a few stations compared with the previous highest stages of record are as follows:

River and station	Flood stage	April 1941		Previous high	
		Crest	Date	Stage	Date
	Feet	*Feet*		*Feet*	
Bourbeuse River: Union, Mo.	12	17.0	21	19.2	October 1919.
Meramec River:					
Sullivan, Mo.	11	16.3	20	15.7	May 1937.
Pacific, Mo.	11	20.0	22	30.8	August 1915.
Valley Park, Mo.	14	21.6	23	30.7	October 1919.
Gasconade River: Jerome, Mo.	15	22.3	21	28.6	August 1915.
Osage River:					
Osceola, Mo.	20	29.8	21	------	
Lakeside, Mo.	60	61.7	20	61.0	June 1937
St. Thomas, Mo.	23	32.3	22	32.9	June 1935.
Verdigris River: Sageeyah, Okla.	35	40.4	22	40.4	April 1929.
Neosho River:					
Parsons, Kans.	22	24.8	17	------	
Oswego, Kans.	17	22.3	17	25.4	April 1927.
Wyandotte, Okla.	23	36.4	20	30.0	April 1912.
Fort Gibson, Okla.	22	33.5	21	35.0	May 1908.
Arkansas River:					
Webbers Falls, Okla.	23	31.3	21	33.6	April 1927.
Fort Smith, Ark.	22	31.4	22	36.7	Do.

Red Basin.—The Red River at Fulton, Ark., and the Little and Sulphur Rivers draining into the Red River in that area exceeded flood stages near the close of the month. There had been frequent flooding in this section during the past few months and no further appreciable damage was caused during April.

The heavy rains in Arkansas during the month resulted in a rise in the upper Ouachita River causing some flooding in the vicinity of Camden, Ark. Damages amounting to $11,000, mostly to prospective crops, were reported.

West Gulf of Mexico drainage.—The Trinity River overflowed its banks at Dallas, Tex., twice during the month, reaching the same crest stage (30.7 feet) on both April 20 and 24. The overflow at Dallas was not serious, but at Trinidad, Tex., several hundred acres of bottom land were flooded. Livestock were removed on the basis of flood warnings.

A flash flood occurred on the Bosque River at Hico, Tex., on April 17 and 18, causing damage amounting to about $4,500.

The Guadalupe and Nueces Rivers were above flood stage at the end of the month. A report will be made on these floods in the next issue of the REVIEW.

Excessive rains caused the Pecos River to reach flood stage at Artesia, N. Mex., on April 29. Some lowlands were flooded below Artesia but no damage of importance occurred. However, there was about $5,000 damage to approaches to bridges by flash floods in tributary streams to the Pecos River in the vicinity of Roswell, N. Mex.

The Rio Grande had approached flood stage at Albuquerque, N. Mex., at the close of the month.

Colorado River Basin.—Heavy rain over the Verde River Basin on April 11 produced some high water in the Verde and Salt Rivers. The flow in the Verde is controlled by Bartlett Dam and the peak stage in the Salt River was held to 4.8 feet at Phoenix, Ariz., on April 14. A radio range site located on low ground near the Salt River sustained considerable damage, the extent of which is not known at this time.

Pacific Slope drainage.—Owing to an abnormally wet winter season discharge in Tulare Lake drainage continued much above normal and surplus water not needed for irrigation continued to flow into the Tulare Lake Basin.

Rain was heavy over the upper Sacramento Basin on March 30, when 4.1 inches occurred at Vollmers, Calif. On April 4 excessive rain was again general with another 4.3 inches at Vollmers, and 3.96 inches at Kennett, Calif., in 24 hours.

The Sacramento River crested at Kennett at 19.7 feet and at Red Bluff, Calif., at 26.2 feet on April 4. These stages were higher than for previous floods this season. The Feather and American Rivers were only moderately high and no important rise occurred in the lower San Joaquin. Many of the local creeks caused overflow damage from the rains of April 4 which were especially heavy in the valley and the adjacent foothills.

At Knights Landing, Calif., with a crest stage of 30.9 feet on April 7, there was an overflow into Yolo Bypass. This overflow, together with a heavy discharge of Cache and Putah Creeks materially increased the volume of water in the bypass. This bypass and also Butte Basin and Sutter Bypass have been flooded since December 1940. In some of the areas the water had been pumped or drained out in March. The reflooding in April resulted in further delay in crop planting.

The total losses from the flooding during April have been estimated to be over $250,000.

ESTIMATED FLOOD LOSSES AND SAVINGS FOR APRIL 1941

River and drainage	Tangible property	Matured crops	Prospective crops	Livestock and other movable farm property	Suspension of business	Total losses	Total reported savings
East Gulf of Mexico: Pearl River	------	------	------	------	$1,000	$1,000	$1,000
Mississippi System—Upper Mississippi Basin:							
Chippewa River	$1,000	------	------	------	------	1,000	------
Upper Mississippi River	48,000	------	$1,000	$10,000	2,000	61,000	5,000
Missouri Basin: Lower Missouri River and tributaries [1]	100,000	------	------	------	------	100,000	3,500
Ohio Basin: Black and Orchard Creeks [2]	100	------	2,050	------	------	2,150	------
White Basin: White River	3,200	800	38,200	400	10,000	52,600	15,000
Arkansas Basin:							
Neosho River in Kansas	15,000	------	1,600	200	------	16,800	------
Marmaton River	1,500	------	1,600	3,000	1,000	7,100	------
Lower Neosho and Arkansas Rivers	3,000	5,000	320,000	1,000	10,000	339,000	190,000
Streams in southwest Missouri	------	------	------	------	------	[3]1,000,000	------
Red Basin: Ouachita River	250	------	10,000	250	500	11,000	11,000
West Gulf of Mexico: Pecos River	5,000	------	------	------	------	5,000	------
Pacific Slope: Sacramento River	141,300	10,600	110,000	1,000	------	262,900	5,000

[1] Mainly Osage River and lower Missouri River from Jefferson City to Hermann, Mo.
[2] Tributaries of Tennessee River in vicinity of Rockwood, Tenn.
[3] From Press reports; 6 lives lost.

FLOOD-STAGE REPORT FOR APRIL 1941

[River district center]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
	Feet			*Feet*	
Connecticut: South Newbury, Vt.	18	16	20	20.8	18
Tioughnioga: Whitney Point, N. Y.	12	4	11	15.5	7
Chenango:					
Sherburne, N. Y.	8	5	15	9.25	6
Greene, N. Y.	8	5	11	10.5	8
Binghamton, N. Y.	16	6	9	18.3	7
Chemung:					
Corning, N. Y.	16	5	6	16.75	6
Elmira, N. Y.	12	5	7	14.9	6
Chemung, N. Y.	12	5	7	16.9	6
Susquehanna:					
Oneonta, N. Y.	12	4	16	13.6	9–10
Bainbridge, N. Y.	12	6	7	12.5	7
Binghamton, N. Y.	14	7	7	14.0	7
Vestal, N. Y.	14	5	12	20.3	7
Towanda, Pa.	16	6	7	18.5	6
Wilkes-Barre, Pa.	22	6	8	23.9	7
James: Columbia, Va.	10	5	9	17.2	6
Roanoke:					
Weldon, N. C.	31	7	8	33.4	7
Williamston, N. C.	10	9	16	10.8	13
Neuse: Smithfield, N. C.	13	6	8	15.5	7
Cape Fear: Lock No. 2, Elizabethtown, N. C.	22	6	8	24.6	7
Peedee: Mars Bluff Bridge, S. C.	17	8	9	17.3	9
Savannah: Clyo, Ga.	11	1	14	12.8	7–8
EAST GULF OF MEXICO DRAINAGE					
Pearl:					
Monticello, Miss.	15	25	25	15.0	25
Pearl River, La.	12	27	(1)	------	------
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Chippewa: Holcombe, Wis.	22	9	9	22.0	9
Bourbeuse: Union, Mo.	12	20	22	17.0	21
Meramec:					
Sullivan, Mo.	11	17	21	16.3	20
Pacific, Mo.	11	18	23	20.0	22
Valley Park, Mo.	14	19	23	21.6	23
Mississippi:					
Aitkin, Minn.[2]	12	14	30	14.7	22–23
Fort Ripley, Minn.	10	19	22	10.1	20
Keokuk, Iowa	12	22	29	12.3	26–27
Quincy, Ill.	14	22	30	14.3	28
Hannibal, Mo.	13	19	(1)	14.3	28–29
Louisiana, Mo.	12	19	(1)	13.0	22
Missouri Basin					
Osage:					
Osceola, Mo.	20	16	24	29.8	21
Lakeside, Mo.	60	18	23	61.7	20
Tuscumbia, Mo.	25	------	------	36.2	21
St. Thomas, Mo.	23	18	25	32.3	22
Gasconade: Jerome, Mo.	15	18	22	22.3	21
Missouri:					
Hermann, Mo.	21	19	25	23.5	20
St. Charles, Mo.	25	20	26	28.8	23
Ohio Basin					
New: New River, Tenn.	18	5	5	18.3	5
Cumberland: Celina, Tenn.	28	6	8	29.8	7

FLOOD-STAGE REPORT FOR APRIL 1941—Continued

[River district center]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
White Basin					
White:	*Feet*			*Feet*	
Cotter, Ark.	21	20	22	28.5	21
Calico Rock, Ark.	18	17	18	19.3	18
		20	23	26.9	21
Batesville, Ark.	23	18	19	23.8	18
		20	24	30.1	22
Newport, Ark.	26	23	25	27.2	24
Georgetown, Ark.	21	25	May 1	22.6	28
Arkansas Basin					
Cimarron: Perkins, Okla.	11	16	17	11.6	17
Verdigris: Sageeyah, Okla.	35	18	23	40.45	22
Neosho: Parsons, Kans.	22	16	17	24.8	17
Oswego, Kans.	17	16	20	22.3	17
Wyandotte, Okla.	23	15	(1)	36.4	20
Fort Gibson, Okla.	22	18	23	33.5	21
North Canadian: Yukon, Okla.	8	16	27	11.0	19
		29	(1)	------	------
Poteau: Poteau, Okla.	21	------	21	25.0	19
Arkansas:					
Webbers Falls, Okla.	23	18	23	31.3	21
Fort Smith, Ark.	22	19	25	31.4	22
Van Buren, Ark.	22	19	25	30.8	22
Ozark, Ark.	22	20	24	26.0	22
Dardanelle, Ark.	22	20	26	27.2	24
Morrilton, Ark.	20	21	26	23.4	24
Pine Bluff, Ark.	25	23	26	26.5	25
Red Basin					
Little Missouri: Boughton, Ark.	20	25	25	20.5	25
Ouachita: Camden, Ark.	26	25	May 1	30.6	28
Little: White Cliffs, Ark.	25	24	28	25.5	26
Sulphur:					
Ringo Crossing, Tex.	20	23	28	29.0	24
		29	(1)	------	------
Naples, Tex.	22	25	(1)	28.2	27
Red: Fulton, Ark.	25	25	28	27.4	26
Lower Mississippi Basin					
Coldwater: Coldwater, Miss.	13	21	21	13.1	21
		24	27	13.9	25
WEST GULF OF MEXICO DRAINAGE					
Elm Fork of Trinity: Carrollton, Tex.	6	23	24	6.5	24
Trinity:					
Dallas, Tex.	28	19	20	30.7	20
		23	26	30.7	24
Trinidad, Tex.	28	24	(1)	------	------
Guadalupe:					
Gonzales, Tex.	20	25	25	20.2	25
		27	(1)	31.3	29
Victoria, Tex.	21	26	(1)	26.6	28
Nueces: Three Rivers, Tex.	37	28	(1)	------	------
PACIFIC SLOPE DRAINAGE					
Sacramento:					
Red Bluff, Calif.	23	4	5	26.2	4
Hamilton City, Calif.	20	5	5	20.1	5
Knights Landing, Calif.	30	5	9	30.9	7

[1] Continued into following month.
[2] Records from U. S. Engineer Office.

CLIMATOLOGICAL DATA

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see REVIEW, January, pp. 30-31]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	65.8	+2.3	Centerville	90	[1] 11	Scottsboro	36	2	2.93	−1.57	Fort Payne	6.13	Fort Deposit	1.23
Arizona	52.4	−6.1	Mohawk	96	29	Alpine	4	18	2.52	+1.89	Junipine	7.58	Yuma Weather Bureau	.26
Arkansas	63.7	+2.2	Camden	94	13	Gilbert	32	[1] 1	5.04	+.14	Gravette	10.49	Gilbert	1.92
California	53.1	−3.0	Brawley	98	28	South Lake	−3	18	4.27	+2.60	Cuyamaca	16.08	Brawley	.12
Colorado	42.3	−1.4	Akron	86	12	Taylor Park	−9	20	2.67	+.91	Wolf Creek Pass	8.13	Manassa	.04
Florida	70.5	+.7	6 stations	92	[1] 4	Chipley	40	7	4.30	+1.39	Key West Airport	15.84	Niceville	.21
Georgia	65.4	+2.1	Brooklet	97	19	Blairsville	33	3	2.06	−1.74	Newnan	4.44	Savannah No. 2	.38
Idaho	45.8	+.7	Orofino	89	29	Island Park Dam	3	19	1.68	+.25	Strevell	3.45	Porthill	.14
Illinois	57.2	+4.8	Jacksonville	90	13	2 stations	26	2	3.75	+.23	Rushville	6.64	Belvidere	1.43
Indiana	57.0	+5.2	Scottsburg	92	13	Angola	23	2	2.68	−.89	La Porte	4.66	Albion	.64
Iowa	53.8	+5.1	3 stations	86	13	Sibley	25	24	2.50	−.22	Clarence	5.05	Millerton	.67
Kansas	56.3	+1.5	2 stations	86	[1] 5	Oberlin	21	[1] 21	3.22	+.68	Pittsburg	9.81	Blue Rapids	.67
Kentucky	60.0	+3.9	4 stations	93	[1] 12	Ashland	27	3	2.89	−1.10	Williamsburg	8.41	Rumsey	1.47
Louisiana	68.7	+1.7	Winnfield	91	12	Urania	40	1	3.34	−1.36	Cheneyville	8.01	Port Sulphur	1.10
Maryland-Delaware	56.8	+4.6	Cumberland, Md.	97	20	Oakland, Md.	17	3	2.98	−.58	Crisfield, Md.	4.57	Cumberland, Md.	1.88
Michigan	48.3	+6.2	2 stations	90	[1] 13	Roscommon	5	2	2.27	−.18	Phoenix	5.08	Channing	.35
Minnesota	48.7	+5.7	Redwood Falls	84	27	Hallock	14	21	3.08	+.96	Gull Lake Dam	6.25	2 stations	1.34
Mississippi	66.4	+1.8	5 stations	90	12	Eupora	36	6	3.67	−1.23	Dlo	9.51	State College	1.20
Missouri	59.2	+4.0	3 stations	90	[1] 12	Licking (near)	29	2	4.50	+.55	Anderson (near)	11.01	Lucerne	1.06
Montana	44.2	+1.1	Libby	85	30	West Yellowstone	−9	19	1.37	+.23	Wyola	5.68	Fortine	.13
Nebraska	50.8	+1.0	Weeping Water	84	12	2 stations	17	[1] 11	3.46	+1.08	Laurel	6.19	Valentine Lakes Refuge.	1.26
Nevada	44.8	+4.8	Overton	103	[1] 25	Eureka	8	17	1.74	+.94	Lamoille	5.17	Golconda	.05
New England	48.6	+4.9	Durham, N. H.	95	20	Fort Kent, Me.	8	7	1.04	−2.31	Nantucket, Mass.	4.79	Williamstown, Mass.	.21
New Jersey	55.5	+5.9	Chatsworth	96	20	Pleasantville	19	7	2.32	−1.33	Belleplain	3.17	Culvers Lake	1.20
New Mexico	47.8	−3.7	2 stations	90	[1] 12	2 stations	5	[1] 19	1.93	+1.05	Bell Ranch	4.97	Pearl (near)	.43
New York	50.2	+6.0	Sodus	95	19	Stillwater Reservoir	5	1	1.55	−1.43	De Ruyter	4.13	Peru	.04
North Carolina	60.9	+3.0	Lumberton	95	19	2 stations	26	[1] 2	3.26	−.35	Pinehurst	6.76	Canton	1.62
North Dakota	44.1	+2.7	Larimore	82	27	Hannah	6	2	2.30	+.86	Milnor	5.67	Bowbells	.35
Ohio	55.5	+5.7	Ironton	92	13	2 stations	22	[1] 2	1.60	−1.58	Springfield No. 2	3.68	Dennison	.51
Oklahoma	61.2	+.9	6 stations	88	[1] 12	Hooker	27	5	5.94	+2.55	Pryor	11.91	Goodwell	1.39
Oregon	47.2	+.5	Unity	92	11	Fremont	8	19	1.69	−.29	Gold Beach	6.07	Echo	.19
Pennsylvania	55.0	+6.4	2 stations	94	20	Kane	18	25	2.01	−1.43	Union City	3.55	New Castle	.75
South Carolina	64.6	+2.4	Marion	95	19	Longcreek (near)	35	2	2.65	−.59	Conway	6.82	Calhoun Falls	.84
South Dakota	48.4	+2.6	2 stations	82	27	Lead	17	19	3.90	+1.82	Harvey's Ranch	7.55	Glenham	1.24
Tennessee	62.1	+3.4	Newport	93	19	Rugby	30	2	3.62	−.82	Cookeville	6.19	Embreeville	1.49
Texas	65.3	−.8	Laredo	101	[1] 17	Stratford	28	20	4.57	+1.54	Columbus	11.87	Crockett	.93
Utah	43.5	−3.6	Toquerville	85	29	Clear Creek	−1	18	2.87	+1.67	Rice Canyon	7.80	Loa	.79
Virginia	58.6	+4.1	Winchester	95	20	Burkes Garden	22	3	3.05	−.30	Columbia	5.09	Timberville	1.16
Washington	51.8	+3.5	Kennewick	89	30	2 stations	19	[1] 17	1.87	−.38	Paradise Inn	5.49	Benton City	.24
West Virginia	56.0	+4.2	2 stations	96	20	Pickens	15	2	2.17	−1.38	Pickens	4.12	Shinnston	.37
Wisconsin	50.0	+6.4	Pittsville	88	12	Laona	10	2	2.27	−.26	Hillsboro	4.79	Holcombe	.80
Wyoming	39.9	−.3	2 stations	75	30	Foxpark	−8	20	3.17	+1.56	Dome Lake	8.75	Powell	.84
Alaska (March)	18.8	+6.6	Tree Point	64	[1] 24	Allakaket	−56	10	1.98	+.18	Latouche	35.07	3 stations	T
Hawaii	70.8	+1.3	Mahukona	91	21	Haleakala	35	[1] 1	3.79	−4.77	Kukui (Maui)	20.00	7 stations	.00
Puerto Rico	76.4	+1.7	Bayamon	98	9	Guineo Reservoir	53	16	5.44	+.97	La Mina (El Yunque).	14.97	Playa Grande (Vieques).	.20

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch, or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
New England	*Ft.*	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	*°F.*	*°F.*	*°F.*		*°F.*	*°F.*		*°F.*	*°F.*	*°F.*	*°F.*	*%*	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*
							48.9	**+5.0**										**68**	**1.41**	**−1.6**										**5.0**		
Eastport	75	67	85	29.95	30.03	+0.10	41.6	+2.6	69	21	48	24	7	35	27	37	34	78	0.46	−2.4	6	10.0	s.	29	ne.	27	9	10	11	5.8	0.0	0.0
Greenville, Maine	1,070	6	41	28.88	30.07		41.4		80	20	55	14	5	28	45	36	29		.90		5		n.				9	9	12		.0	.0
Portland, Maine [1]	103	5	36	29.93	30.04	+.08	46.4	+3.4	77	14	59	23	1	34	35	40	33	63	.71	−2.7	6	8.4	s.	33	n.	27	20	4	6	3.5	.0	.0
Concord [2]	289	54	72	29.74	30.06	+.07	51.4	+8.0	92	20	66	22	7	37	45	42	34	58	.42	−2.4	6	6.5	n.	25	ne.	27	12	10	8	4.8	.0	.0
Burlington [2]	403	11	48	29.62	30.07	+.08	48.1	+4.8	86	20	59	23	1	37	43	42	35	66	.70	−1.4	8	9.3	n.	26	s.	19	9	13	8	5.3	.0	.0
Northfield	876	12	60	29.12	30.08	+.09	46.5	+6.2	88	20	61	17	2	32	49				.60	−1.7	6	7.9	sw.	29	sw.	21	9	13	8	5.5	.0	.0
Boston [1]	124	33	62	29.92	30.05	+.08	51.6	+5.2	89	20	61	32	7	42	38	43	35	60	1.70	−1.6	8	11.8	nw.	36	ne.	6	10	8	12	5.8	.0	.0
Nantucket	12	10	63	30.03	30.04	+.07	46.6	+3.2	73	30	54	32	5	40	29	41	38	79	4.79	+1.8	11	14.5	sw.	41	ne.	6	11	8	11	5.6	2.8	.0
Block Island	26	11	46	30.03	30.06	+.08	47.0	+3.0	73	30	54	33	7	40	29	42	39	78	1.81	−1.7	11	14.6	sw.	40	ne.	6	16	7	7	4.0	.0	.0
Providence [2]	159	57	78	29.89	30.07	+.09	52.6	+6.0	85	30	63	32	7	42	39	43	37	68	1.53	−1.7	9	12.4	nw.	37	n.	27	14	6	10	4.8	.0	.0
Hartford [1]	159	5	44	29.89	30.06	+.07	52.7	+6.0	88	15	66	26	7	39	40	44	37	63	1.04	−2.3	6	10.3	n.	28	ne.	27	12	5	13	5.5	.0	.0
New Haven [2]	107	5	39	29.96	30.07	+.08	53.5	+6.3	86	15	64	35	7	43	38	43	36	63	1.75	−1.8	7	9.4	n.	27	ne.	6	15	5	10	4.5	.0	.0
Middle Atlantic States							**57.5**	**+6.0**										**63**	**2.48**	**−0.6**										**4.4**		
Albany [1]	97	26	40	29.96	30.06	+.06	52.2	+5.4	93	20	65	26	4	39	39	44	36	59	.72	−1.7	8	10.5	n.	32	w.	14	11	10	9	5.2	T	.0
Binghamton	871	57	79	29.16	30.10	+.08	52.6	+7.2	92	20	65	27	4	40	40	45	40	70	1.87	−.6	11	6.2	ne.	24	sw.	20	12	9	9	4.7	T	.0
New York	314	415	454	29.72	30.06	+.06	56.0	+6.6	85	14	66	36	3	46	33	46	37	56	3.12	−.1	7	13.2	n.	49	nw.	21	15	7	8	4.4	.0	.0
Harrisburg [1]	374	30	49	29.67	30.07	+.05	58.2	+7.3	92	20	71	32	8	45	37	48	40	57	1.76	−.9	7	7.9	w.	31	s.	20	14	5	11	4.5	.0	.0
Philadelphia [2]	114	174	367	29.95	30.07	+.06	59.2	+7.1	90	20	70	37	3	48	37	48	42	63	2.48	−.6	6	11.9	n.	35	sw.	20	16	8	6	3.7	.0	.0
Reading	323	47	306	29.73	30.08		58.4	+7.7	91	20	70	35	8	47	32	48	38	52	1.88	−1.5	6	10.9	nw.	43	nw.	21	15	8	7	3.8	.0	.0
Scranton	805	72	104	29.22	30.09	+.08	55.0	+6.9	91	20	67	31	9	43	34				1.52	−1.2	9	6.9	n.	27	nw.	21	17	7	6	3.5	T	.0
Atlantic City	52	37	172	30.01	30.07	+.07	52.6	+4.8	90	14	60	34	3	45	43	46	41	70	2.99	.0	6	14.7	s.	46	e.	5	14	8	8	4.4	.0	.0
Trenton	190	89	107	29.86	30.07		57.3	+7.5	91	20	69	34	3	45	39	47	39	57	2.03	−.9	6	9.1	n.	27	s.	20	14	8	8	4.5	.0	.0
Baltimore [2]	123	100	215	29.94	30.08	+.07	60.4	+6.8	94	20	70	39	3	51	36	50	44	64	3.29	.0	7	10.3	n.	31	nw.	21	14	9	7	4.2	.0	.0
Washington	112	62	85	29.95	30.07	+.05	60.6	+7.3	94	20	71	37	3	50	33	50	41	54	2.73	−.5	6	6.7	nw.	22	nw.	22	14	9	7	4.3	.0	.0
Cape Henry	18	8	54	30.04	30.06		56.0	+1.4	93	20	64	36	9	48	28	51	47	75	2.52	−.8	6	10.9	se.	36	n.	22	15	7	8	4.4	.0	.0
Lynchburg	686	144	184	29.34	30.08	+.06	62.2	+4.9	92	19	75	33	3	50	40	51	43	59	3.77	+.8	9	6.5	nw.	35	sw.	20	9	13	8	5.2	.0	.0
Norfolk [2]	91	80	125	29.98	30.08	+.07	60.6	+3.8	91	20	70	40	4	51	32	51	48	75	3.24	.0	7	9.4	ne.	32	se.	5	15	3	12	4.8	.0	.0
Richmond [2]	144	11	52	29.92	30.07	+.05	61.2	+4.6	92	19	73	38	3	50	39	51	45	67	3.23	−.3	7	7.7	ne.	26	sw.	20	12	8	10	4.7	.0	.0
South Atlantic States							**64.7**	**+2.9**										**71**	**2.23**	**−0.8**										**5.3**		
Asheville	2,253	89	104	27.75	30.09	+.06	58.4	+4.5	85	19	70	38	28	47	39	49	43	65	1.80	−1.2	7	7.5	nw	23	se.	3	7	9	14	6.3	.0	.0
Charlotte [2]	779	63	86	29.24	30.06	+.03	64.0	+4.2	89	19	74	46	7	54	32	53	47	65	3.04	−.3	7	6.8	ne.	24	sw.	20	10	10	10	5.4	.0	.0
Greensboro [1]	886	6	56	29.14	30.08		60.3		89	19	73	36	3	48	39	51	46	66	2.60		6	7.6	sw.	27	sw.	20	12	9	9	5.1	.0	.0
Hatteras	11	5	50	30.06	30.07	+.06	59.2	−.6	78	15	66	43	3	52	22	55	53	85	2.46	−1.1	5	12.4	ne.	43	nw	5	14	7	9	4.7	.0	.0
Raleigh [1]	376	27	69	29.67	30.08	+.05	63.6	+4.2	93	19	76	40	7	52	35	53	47	65	4.10	+.7	8	8.5	ne.	25	sw.	20	5	14	11	6.4	.0	.0
Wilmington	72	73	107	30.00	30.07	+.04	64.8	+2.8	89	15	75	45	7	55	30	56	51	71	2.65	.0	5	9.6	sw.	37	s.	4	13	9	8	4.4	.0	.0
Charleston [2]	48	11	92	30.02	30.07	+.04	66.0	+1.5	88	15	73	51	2	59	28	58	54	77	1.38	−1.2	10	10.7	ne.	31	ne.	22	11	7	12	5.2	.0	.0
Columbia, S. C. [2]	347	70	91	29.70	30.07	+.04	66.4	+3.1	89	19	77	48	2	56	31	56	50	66	2.13	−.8	7	8.3	ne.	23	sw.	20	12	12	6	4.5	.0	.0
Greenville, S. C.	1,040	70	78	28.98	30.08		63.4	+4.8	87	14	73	46	5	53	30				2.24	−1.5	7	7.1	ne.	24	sw.	20	13	7	10	4.9	.0	.0
Augusta [2]	182	62	77	29.87	30.06	+.03	67.2	+3.0	90	19	78	46	2	56	31	56	49	63	1.86	−1.3	8	5.8	e.	21	w.	5	10	10	10	5.3	.0	.0
Savannah [2]	65	73	152	30.00	30.07	+.04	69.0	+3.0	89	21	79	52	6	59	29	59	56	76	1.89	−.7	7	11.2	sw.	30	e.	8	10	7	13	5.6	.0	.0
Jacksonville [2]	43	86	110	30.02	30.06	+.02	70.2	+1.5	90	19	79	52	6	61	27	61	58	78	.99	−1.4	4	7.4	s.	22	ne.	30	10	4	16	6.0	.0	.0
Florida Peninsula							**73.9**	**+0.8**										**78**	**8.46**	**+6.3**										**4.9**		
Key West [2]	21	10	64	29.97	29.99	−.03	75.8	+.1	86	25	81	67	1	71	13	70	68	82	13.14	+11.8	8	10.9	e.	26	e.	29	15	8	7	4.5	.0	.0
Miami [2]	25	124	168	29.98	30.01	−.02	74.4	+1.6	84	25	79	60	6	70	21	67	64	73	6.74	+3.6	10	10.8	e.	40	se.	5	12	10	8	4.9	.0	.0
Tampa [1]	35	5	61	29.99	30.03	−.03	71.6	+.7	87	22	80	55	7	63	23	64	62	79	5.49	+3.5	4	11.4	e.	34	e.	29	10	12	8	5.3	.0	.0
East Gulf States							**67.5**	**+2.4**										**74**	**2.63**	**−1.6**										**5.5**		
Atlanta [1]	1,173	5	72	28.83	30.06	+.03	63.6		88	19	74	44	6	53	31	55	49	67	3.12		10	8.6	e.	32	se.	3	10	7	13	6.1	.0	.0
Macon [2]	370	79	87	29.66	30.06	+.03	66.1	+2.2	89	19	77	48	6	55	32	57	51	66	.87	−2.3	7	6.5	e.	23	n.	4	8	9	13	5.9	.0	.0
Thomasville	273	49	58				68.4	+1.7	88	19	80	48	6	57	31				2.94	−.4	7						5	14	11		.0	.0
Apalachicola	35	11	51	30.00	30.03		68.0	+.9	82	25	75	52	2	61	20	63	61	83	2.31	−.5	3	9.4	se.	35	se.	3	10	9	11	5.1	.0	.0
Pensacola	56	54	79	29.98	30.04	+.02	68.2	+1.5	81	25	74	52	1	62	21	63	60	80	2.93	−1.1	5	8.3	se.	29	se.	3	11	9	10	5.0	.0	.0
Anniston	741	9					64.0	+3.6	88	19	75	42	6	53	34				2.63	−1.7	6		s.				14	9	7		.0	.0
Birmingham [2]	700	11	48	29.32	30.05	+.03	65.9	+2.6	85	12	76	46	6	56	28	56	50	67	3.02	−1.8	9	7.2	s.	23	s.	3	11	4	15	5.8	.0	.0
Mobile [2]	57	86	161	29.97	30.03	+.01	68.6	+2.3	85	12	77	51	1	60	27	61	59	81	2.34	−2.3	5	10.0	s.	30	e.	7	8	14	8	5.5	.0	.0
Montgomery [2]	218	92	105		30.05	+.02	67.6	+2.3	85	11	77	48	6	58				72	1.96	−2.3	9	6.6	e.	24	w.	4	11	8	11		.0	.0
Meridian [2]	375	67	92	29.63	30.03	+.01	66.4	+2.4	87	12	78	42	6	55	37	58	53	71	4.78		6	5.7	s.	22	w.	4	11	13	6	4.9	.0	.0
Vicksburg [2]	247	82	102	29.73	29.99	−.01	67.8	+2.2	86	12	77	51	5	58	28	58	54	78	3.88	−1.3	7	9.2	se.	35	w.	3	10	9	11	5.4	.0	.0
New Orleans [2]	53	76	84	29.94	30.00	.00	71.2	+2.4	85	9	79	56	6	63	22	63	60	77	3.38	−1.9	8	7.7	se.	20	se.	19	8	12	10	5.9	.0	.0
West Gulf States							**67.4**	**+1.0**										**77**	**5.08**	**+1.4**										**6.7**		
Shreveport [2]	249	92	227	29.71	29.97	.00	67.8	+2.0	85	18	77	47	5	59	29	59	55	72	2.49	−2.1	10	12.3	s.	30	s.	18	5	10	15	6.4	.0	.0
Bentonville	1,303	12	51	28.62	29.98	+.02	61.0	+4.1	86	12	71	40	20	51	34				8.80	+4.4	14	8.0	s.	24	s.	13	3	14	13	5.9	.0	.0
Fort Smith	463	57	82	29.46	29.94	−.02	64.4	+2.6	86	11	74	42	4	55	33	55	49	62	4.52	+.6	13	8.8	e.	26	e.	17	3	15	12	6.7	.0	.0
Little Rock [2]	357	94	102	29.62	30.00	+.02	64.7	+2.6	85	12	73	47	20	56	31	57	53	74	4.97	−.2	11	8.1	s.	27	w.	7	4	9	17	6.7	.0	.0
Austin [2]	605	68	90	29.28	29.91		66.8	−1.0	86	17	75	45	5	59	37	60	57	80	5.70	+1.4	15	8.4	se.	20	se.	12	7	7	16	6.5	.0	.0
Brownsville [2]	57	88	96	29.79	29.86		73.4	−.3	91	19	80	56	5	66	27	67	65	83	2.19	+.8	13	12.3	se.	33	se.	1	6	9	15	6.5	.0	.0
Corpus Christi [2]	20	11	78	29.86	29.88	−.07	71.6	+.8	86	7	77	58	20	66	23	66	65	87	7.40	+5.6	8	13.6	se.	35	e.	26	6	5	19	7.1	.0	.0
Dallas [1]	512	6	46	29.39	29.93		65.8		85	17	75	41	5	57	39	59	55	74	4.28	.0	17	12.6	s.	40	se.	17	5	8	17	7.2	.0	.0
Fort Worth [1]	679	35	56	29.21	29.92	−.02	65.4	+.4	86	17	74	41	5	56	41	59	55	76	3.52	−.5	18	13.0	se.	42	nw.	17	5	10	15	6.9	.0	.0
Galveston [2]	54	106	114	29.87	29.93	−.04	68.6	−.1	80	7	73	57	21	64	19	64	62	85	8.38	+5.3	11	12.4	se.	31	se.	23	8	2	20	6.8	.0	.0
Houston [2]	138	157	190	29.79	29.94		70.2	+.9	84	8	77	55	21	63	25	63	60	81	7.23	+3.6	13	13.2	se.	30	se.	13	7	5	18	6.7	.0	.0
Palestine	510	64	72	29.43	29.96	.00	66.6	+.6	84	17	75	48	5	59	30	59	54	70	3.55	−.9	10	9.1	se.	26	se.	13	8	4	18	6.5	.0	.0
Port Arthur	34	59	134	29.91	29.95		69.6		83	3	76	53	5	63	25				3.56	+.6	12	17.0	se.	52	se.	23	8	6	16	6.4	.0	.0
San Antonio [1]	693	28	59	29.29	29.90	−.03	68.6	−.5	89	17	77	46	5	60	36	62	59	78	4.56	+1.4	14	10.3	se.	30	se.	6	7	5	18	6.9	.0	.0

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch, or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
Ohio Valley and Tennessee	*Ft.*	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	*°F.*	*°F.*	*°F.*		*°F.*	*°F.*		*°F*	*°F.*	*°F.*	*°F*	*%*	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*
							59.6	**+5.2**										**67**	**2.43**	**−1.2**										**5.4**		
Chattanooga [1]	762	21	54	29.24	30.06	+.03	62.0	-----	86	19	75	36	2	49	39	54	49	71	3.17	-----	9	6.0	s.	34	w.	4	6	10	14	6.4	.0	.0
Knoxville [2]	995	66	84	29.01	30.06	+.03	62.8	+4.8	90	19	74	42	2	52	31	53	47	66	4.01	−.1	7	5.5	ne.	20	nw.	4	11	8	11	5.2	.0	.0
Memphis [2]	399	78	86	29.59	30.00	.00	64.8	+3.0	86	12	76	41	6	54	36	56	50	65	3.72	−1.1	7	7.7	s.	21	sw.	17	12	9	9	5.3	.0	.0
Nashville [2]	546	167	187	29.46	30.04	+.03	64.0	+5.0	84	12	73	45	2	55	29	54	49	66	2.40	−1.7	6	9.4	s.	43	s.	3	10	13	7	5.1	.0	.0
Lexington	989	6	-----	-----	-----	-----	59.0	+4.7	86	19	71	35	2	47	35	-----	-----	-----	2.22	−1.3	9	-----	s.	-----	-----	-----	16	10	4	3.4	.0	.0
Louisville [2]	525	106	120	29.49	30.05	+.04	61.0	+4.6	86	13	71	41	2	51	31	52	47	69	2.77	−1.1	9	8.2	ne.	29	sw.	19	13	9	8	4.8	.0	.0
Evansville [1]	431	5	38	29.57	30.04	+.04	59.3	+2.6	85	13	71	39	26	48	34	52	46	68	2.21	−1.7	12	8.1	sw.	34	nw.	16	8	8	14	6.1	.0	.0
Indianapolis [2]	823	98	129	29.17	30.05	+.05	59.0	+6.9	86	13	69	35	25	49	31	49	44	68	1.91	−1.7	10	8.1	e.	31	nw.	21	6	11	13	6.2	.0	.0
Terre Haute [2]	575	68	149	29.43	30.05	-----	59.3	-----	86	13	70	37	22	49	31	51	46	72	3.99	+.3	9	9.5	sw.	31	sw.	20	7	8	15	6.4	.0	.0
Cincinnati [2]	627	11	51	29.39	30.07	+.06	59.2	+6.8	86	13	70	35	22	48	35	50	44	67	1.37	−1.8	10	7.6	ne.	30	sw.	20	8	10	12	5.7	.0	.0
Columbus [2]	822	90	110	29.19	30.07	+.05	58.0	+6.8	86	13	70	31	2	46	35	48	42	67	2.32	−.6	8	8.7	s.	41	sw.	20	9	12	9	5.5	.0	.0
Dayton [2]	900	186	213	29.11	30.08	-----	57.3	+5.7	84	13	68	32	2	47	33	48	43	68	1.63	−1.6	9	9.6	sw.	41	sw.	20	9	9	12	5.8	.0	.0
Elkins [1]	1,947	61	78	28.04	30.10	+.07	54.0	+5.2	88	20	68	23	3	40	48	46	40	71	2.43	−1.2	10	5.3	nw.	26	sw.	20	6	13	11	6.0	.0	.0
Parkersburg	637	77	84	29.39	30.07	+.04	59.2	+5.8	89	19	72	33	3	46	39	49	42	62	1.70	−1.5	8	6.1	nw.	28	nw.	21	14	10	6	4.4	.0	.0
Pittsburgh [1]	842	39	54	29.17	30.08	+.06	57.0	+5.8	87	19	69	30	2	45	34	46	37	56	1.36	−1.6	5	9.8	n.	42	nw.	21	11	14	5	4.5	.0	.0
Lower Lake Region							**50.9**	**+5.5**										**67**	**1.53**	**−1.0**										**4.5**		
Buffalo [1]	768	243	280	29.27	30.10	+.09	48.2	+5.4	75	19	57	28	2	40	32	42	36	66	1.69	−.9	9	14.6	sw.	50	w.	20	15	3	12	4.4	T	.0
Canton	448	10	61	29.60	30.08	-----	47.6	+5.1	84	20	60	21	2	35	39	42	36	65	.57	−1.6	6	8.4	w.	30	w.	20	9	11	10	5.3	T	.0
Ithaca	836	77	100	-----	-----	-----	51.6	+6.6	88	20	65	26	2	38	37	-----	-----	-----	2.56	.0	9	8.3	nw.	26	nw.	17	14	8	8	4.3	T	.0
Oswego	335	71	85	29.72	30.10	+.09	47.9	+4.3	85	20	57	29	4	39	34	43	37	68	.66	−1.7	8	8.2	w.	23	sw.	17	15	9	6	4.0	.7	.0
Rochester [1]	523	5	69	29.53	30.10	+.09	49.7	+4.8	86	20	62	26	2	38	36	43	38	69	1.51	−.8	10	10.9	sw.	44	w.	20	13	10	7	4.1	.4	.0
Syracuse [1]	596	5	51	29.44	30.09	+.08	50.6	+5.9	90	20	63	24	4	38	40	44	38	67	1.97	−.5	10	9.9	sw.	35	w.	20	11	7	12	4.9	.4	.0
Erie [2]	714	57	81	29.33	30.11	+.09	50.5	+5.4	83	19	60	28	2	41	36	43	38	68	1.58	−1.2	7	7.9	ne.	26	sw.	20	17	10	3	3.4	.0	.0
Cleveland [1]	762	27	54	29.26	30.09	+.07	52.0	+5.8	83	19	61	30	2	43	32	45	38	63	1.13	−1.3	8	13.1	ne.	51	sw.	20	15	6	9	4.2	.0	.0
Sandusky	629	5	67	-----	-----	-----	52.4	+5.2	86	13	62	31	2	43	31	-----	-----	-----	1.65	−.9	9	9.1	e.	31	sw.	20	13	9	8	4.7	.0	.0
Toledo [2]	628	79	87	29.40	30.09	+.08	53.4	+5.8	85	13	62	27	2	44	29	45	40	69	1.38	−1.3	8	9.8	e.	35	w.	20	13	10	7	4.3	.0	.0
Fort Wayne [1]	857	69	84	29.15	30.08	-----	53.9	+5.5	85	13	66	26	2	42	38	46	41	69	2.06	−1.0	11	8.0	e.	40	w.	20	8	7	15	5.9	.0	.0
Detroit [1]	730	5	78	29.31	30.10	+.08	52.6	+6.4	87	13	64	26	2	41	37	45	38	62	1.55	−.9	8	9.8	ne.	41	sw.	20	12	5	13	4.8	.0	.0
Upper Lake Region							**48.0**	**+6.5**										**71**	**2.44**	**0.0**										**5.7**		
Alpena	609	5	89	29.43	30.10	+.08	45.4	+6.8	81	14	55	20	2	36	30	39	33	66	2.47	+.2	6	10.4	se.	32	sw.	20	14	3	13	4.9	T	.0
Escanaba	612	51	72	29.42	30.10	+.08	43.7	+5.8	67	30	52	22	2	35	27	39	35	79	1.54	−.7	8	9.7	s.	29	nw.	20	7	9	14	6.2	T	.0
Grand Rapids [2]	707	70	244	29.29	30.06	+.04	53.4	+6.4	81	14	64	26	2	42	31	44	38	68	1.59	−1.2	9	12.4	e.	50	sw.	20	12	9	9	4.7	T	.0
Lansing [2]	878	5	90	29.14	30.10	-----	51.8	+6.2	82	13	64	24	2	40	34	44	39	70	2.44	−.1	9	8.6	e.	31	sw.	20	14	9	7	4.4	.0	.0
Marquette	734	44	73	29.26	30.08	+.06	45.3	+7.5	81	29	55	26	3	36	31	40	34	70	3.70	+1.3	10	7.2	nw.	29	s.	20	10	8	12	5.4	1.3	.0
Sault Sainte Marie [2]	614	11	52	29.41	30.09	+.06	45.4	+8.0	79	28	57	21	2	34	43	38	32	69	3.06	+.9	12	6.5	w.	29	nw.	21	9	9	12	5.9	.1	.0
Chicago	673	7	131	29.33	30.06	+.06	52.7	+5.8	83	14	60	33	2	45	27	45	40	69	2.63	−.2	11	10.3	e.	38	sw.	20	7	8	15	6.3	.0	.0
Green Bay	617	109	141	29.38	30.06	+.05	48.9	+5.7	80	30	58	26	2	40	28	43	37	69	2.31	−.3	9	10.9	n.	32	s.	14	8	8	14	6.2	T	.0
Milwaukee [1]	681	33	66	29.32	30.06	+.07	49.3	+5.5	82	12	58	31	2	40	35	43	39	74	1.93	−.8	9	13.0	sw.	47	sw.	14	8	6	16	6.1	T	.0
Duluth	1,133	5	47	28.80	30.03	+.02	44.0	+7.0	76	29	52	28	1	36	30	39	35	75	2.74	+.7	15	12.2	ne.	31	ne.	3	4	8	18	7.2	2.6	.0
North Dakota							**44.1**	**+3.1**										**77**	**2.00**	**+0.6**										**7.5**		
Moorhead, Minn. [2]	940	50	58	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bismarck [1]	1,677	4	41	28.17	29.98	+.01	45.6	+3.5	77	27	55	20	3	36	38	41	36	76	1.60	+.1	16	12.2	e.	34	nw.	20	3	9	18	7.9	.2	.0
Devils Lake	1,478	11	44	28.40	29.99	.00	43.0	+4.2	79	27	51	15	2	35	34	39	36	80	2.68	+1.2	14	9.7	n.	26	sw.	28	2	5	23	8.2	1.9	.0
Lemmon, S. Dak	2,602	4	38	27.21	29.95	-----	43.9	-----	70	26	53	21	3	34	42	40	36	-----	2.54	-----	12	-----	nw.	-----	-----	-----	4	6	20	-----	.5	.0
Grand Forks	832	11	71	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Williston	1,878	42	50	27.98	29.98	+.02	43.6	+1.6	74	28	52	24	3	35	34	39	34	74	1.73	+.5	10	8.1	n.	23	se.	10	7	9	14	6.5	7.1	.0
Upper Mississippi Valley							**56.1**	**+5.7**										**70**	**3.00**	**0.0**										**6.6**		
Minneapolis-St. Paul, Minn. [1]	919	32	61	28.98	29.98	−.01	52.8	+6.4	80	30	63	30	1	43	29	46	40	68	1.87	−.4	10	11.6	se.	37	sw.	14	3	10	17	7.2	T	.0
Springfield, Minn.	1,025	4	42	28.86	29.97	-----	51.4	-----	80	28	60	29	1	42	33	46	42	-----	3.58	-----	13	-----	s.	-----	-----	-----	2	11	17	-----	.2	.0
La Crosse [2]	714	11	48	29.24	30.01	+.03	54.5	+7.3	80	30	64	31	2	45	29	46	41	67	2.70	+.3	11	6.2	s.	21	sw.	14	3	11	16	6.8	T	.0
Madison [2]	974	70	78	28.99	30.05	+.06	52.0	+6.6	79	12	61	30	2	43	31	45	40	71	1.24	−1.5	9	8.7	s.	28	sw.	14	7	9	14	6.7	T	.0
Charles City	1,015	10	51	28.91	30.01	+.03	52.8	+6.4	81	13	63	31	24	42	34	46	41	71	1.90	−.6	10	7.9	se.	29	sw.	14	7	7	16	6.4	T	.0
Davenport [2]	606	66	161	29.36	30.02	+.04	55.8	+5.9	82	12	65	34	2	47	29	48	44	73	4.49	+1.8	13	9.7	se.	32	w.	20	7	7	16	6.5	T	.0
Des Moines [2]	860	5	99	29.04	29.97	.00	55.6	+5.5	82	13	66	35	21	45	33	47	42	68	1.46	−1.4	8	11.1	se.	46	sw.	13	8	3	19	7.0	.0	.0
Dubuque	699	60	79	29.27	30.02	+.04	54.7	+6.1	82	12	64	32	2	45	29	47	41	65	3.18	+.3	6	6.7	s.	21	nw.	20	6	8	16	6.7	.0	.0
Keokuk	614	64	78	29.35	30.01	+.03	56.8	+4.5	86	13	66	38	2	48	27	-----	-----	-----	2.83	−.2	12	7.8	s.	30	sw.	19	7	8	15	6.3	.0	.0
Cairo	358	87	93	29.64	30.03	+.04	62.8	+4.7	87	12	72	42	6	54	32	-----	-----	-----	2.06	−1.7	10	8.2	s.	27	sw.	14	4	12	14	6.7	.0	.0
Peoria [2]	609	11	45	29.37	30.03	+.04	56.0	+5.1	87	13	66	35	2	46	32	49	45	75	4.40	+1.0	10	6.8	e.	25	sw.	20	11	6	13	5.4	.0	.0
Springfield, Ill. [2]	636	5	191	29.34	30.02	+.04	58.3	+5.6	89	13	68	38	24	49	29	50	46	76	5.37	+1.9	12	11.2	s.	32	n.	18	6	4	20	7.3	.0	.0
St. Louis [2]	568	179	303	29.40	30.01	+.03	60.6	+4.5	87	13	69	39	1	52	28	52	45	64	4.47	+.7	12	11.6	s.	33	sw.	19	8	8	14	5.9	.0	.0
Missouri Valley							**55.6**	**+4.0**										**72**	**4.04**	**+1.2**										**7.2**		
Columbia, Mo. [2]	784	6	66	29.15	29.99	+.01	59.0	+4.1	87	13	69	38	1	49	33	50	45	69	3.94	+.2	10	8.4	e.	28	s.	19	6	12	12	6.1	.0	.0
Kansas City [1]	963	38	76	28.93	29.96	.00	59.0	+4.2	83	12	69	39	5	49	30	51	45	66	4.03	+.9	15	11.4	ne.	41	sw.	19	5	8	17	7.0	.0	.0
St. Joseph [2]	967	11	49	28.93	29.96	-----	57.5	+4.0	81	12	67	38	10	48	30	50	46	74	5.04	+1.8	14	10.1	se.	30	sw.	19	7	10	13	6.4	.0	.0
Springfield, Mo. [1]	1,324	5	60	28.58	29.97	.00	59.2	+3.2	84	12	69	38	5	49	33	52	47	69	7.57	+3.7	11	12.9	se.	44	s.	17	3	11	16	7.3	.0	.0
Topeka	987	65	87	29.89	29.94	-----	58.6	+3.9	82	12	69	39	19	48	31	51	46	69	3.32	+.5	15	10.1	se.	27	s.	18	4	10	16	7.0	.0	.0
Lincoln [2]	1,189	11	81	28.67	29.94	.00	54.2	+2.7	79	12	63	34	5	45	29	48	44	76	3.12	+.6	14	11.3	se.	34	s.	13	3	8	19	7.7	T	.0
Omaha [1]	1,105	31	44	28.77	29.95	.00	55.2	+4.0	80	12	64	35	21	46	31	49	44	71	3.07	+.6	9	12.0	se.	38	s.	13	6	4	20	7.5	.0	.0
Valentine	2,598	46	54	27.20	29.92	−.02	49.2	+3.5	75	11	60	24	3	39	34	43	38	72	2.53	+.5	15	11.4	s.	36	nw.	14	4	11	15	7.2	1.3	.0
Sioux City [2]	1,138	64	106	28.73	29.95	.00	53.2	+5.4	77	12	62	32	21	45	31	47	43	74	3.76	+1.1	18	10.5	s.	32	nw.	14	3	6	21	7.8	.0	.0
Huron [1]	1,301	26	41	28.54	29.94	−.02	50.6	+5.5	79	12	60	23	3	41	36	46	41	75	4.05	+1.8	16	15.2	se.	43	nw.	20	3	8	19	7.6	.1	.0
Northern Slope							**44.9**	**+1.5**										**68**	**2.76**	**+1.3**										**6.5**		
Billings [1]	3,570	18	39	26.24	29.93	-----	45.2	-----	75	30	56	19	19	35	37	38	31	64	2.00	-----	11	11.2	sw.	36	ne.	13	8	11	11	6.0	18.0	.0
Havre	2,507	11	67	27.31	29.95	+.02	46.5	+2.8	76	27	59	25	8	34	40	39	31	61	1.08	+.1	10	9.0	e.	24	w.	23	12	8	10	5.1	1.4	.0
Helena [1]	4,124	5	35	25.74	29.97	.00	44.2	+.7	74	30	56	18	19	33	41	38	31	67	1.74	+.6	11	8.1	w.	33	n.	13	7	7	16	6.4	3.1	.0
Missoula [2]	3,263	80	91	26.56	29.94	-----	48.8	+3.6	82	30	61	27	18	37	38	40	33	65	1.04	.0	10	7.1	e.	39	e.	1	9	7	14	6.0	1.4	.0
Kalispell	2,973	48	56	26.87	29.92	−.04	47.5	+3.9	78	30	60	25	18	35	37	40	30	57	.55	−.2	6	6.0	w.	21	nw.	23	8	9	13	5.7	.3	.0
Miles City [2]	2,371	48	55	27.45	29.96	.00	46.4	+1.7	74	28	56	22	4	36	33	39	34	71	1.65	+.5	10	7.5	ne.	23	n.	13	3	11	16	7.1	3.0	.0
Rapid City [2]	3,259	50	58	26.54	29.93	−.02	45.0	+.7	70	26	54	23	3	36	32	40	35	73	6.47	+4.4	17	8.7	n.	32	n.	13	3	12	15	7.4	21.9	.0
Cheyenne [1]	6,094	5	39	23.88	29.89	−.02	40.6	−.3	66	12	51	21	19	30	35	35	30	72	3.70	+1.7	15	12.1	nw.	38	nw.	13	3	12	15	7.4	21.9	.0
Lander	5,352	60	68	24.57	29.91	−.03	41.2	−1.2	69	30	50	21	20	32	31	36	30	69	5.32	+3.3	16	5.6	sw.	28	sw.	16	5	8	17	7.1	21.8	.0
Sheridan [2]	3,790	6	42	26.03	29.93	-----	43.2	-----	68	29	54	22	19	32	40	38	32	72	3.87	+2.0	16	10.4	nw.	41	nw.	17	3	9	18	7.4	2.2	.0
Yellowstone Park	6,241	12	46	23.79	29.99	+.03	37.8	+1.2	64	30	49	8	19	27	33	32	26	68	1.30	+.2	13	7.8	n.	26	sw.	3	7	8	15	6.4	9.4	.0
North Platte [2]	2,821	11	51	26.98	29.90	−.02	50.6	+2.0	76	12	61	28	3	40	33	44	39	72	3.64	+1.6	9	10.7	s.	34	s.	13	6	13	11	6.1	.8	.0

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch, or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	°*F.*	°*F.*	°*F.*		°*F.*	°*F.*		°*F*	°*F.*	°*F.*	°*F.*	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*
Middle Slope							54.0	+0.6										69	2.66	+0.4										6.8		
Denver [2]	5,292	106	113	24.61	29.85	−.05	46.8	−.3	70	5	57	26	19	37	31	38	32	65	2.75	+.7	18	7.6	s.	23	n.	17	7	12	11	6.2	8.9	.0
Pueblo	4,690	5	36	25.16	29.83	−.05	49.4	−.7	77	12	62	28	7	37	41	41	34	63	.91	−.4	12	9.8	e.	42	sw.	13	6	10	14	6.5	1.9	.0
Concordia	1,392	50	58	28.46	29.93	.00	55.6	+2.1	80	11	65	35	5	46	31	49	44	70	1.27	−1.1	9	9.8	s.	29	s.	13	6	7	17	6.8	.0	.0
Dodge City	2,509	10	86	27.30	29.90	.00	53.8	+.2	78	17	64	32	19	44	41	46	41	69	2.32	+.5	11	14.0	s.	36	s.	10	4	11	15	7.1	.9	.0
Wichita [1]	1,358	6	64	28.49	29.92	−.01	57.0	+.6	80	10	67	36	9	47	36	51	47	75	2.83	−.1	13	16.2	s.	42	se.	2	4	8	18	7.1	.0	.0
Oklahoma City [2]	1,214	10	47	28.65	29.93	+.01	61.2	+1.4	84	17	70	36	5	52	41	54	49	72	5.90	+2.6	16	9.9	s.	25	s.	6	6	10	14	6.9	.0	.0
Chadron	3,439	5	44	26.86	29.90	------	47.6	------	72	1	57	26	3	38	34	41	37	---	2.78	------	17	------	s.	--	------	---	4	12	14	----	2.5	.0
Southern Slope							62.0	−0.8										60	2.95	+1.2									5.4		
Abilene [2]	1,738	10	56	28.09	29.88	−1.02	65.0	+.6	88	17	75	44	20	55	36	56	50	70	4.76	+2.0	10	11.1	se.	35	w.	2	10	6	14	57	.0	.0
Amarillo [2]	3,676	10	49	26.17	29.87	.00	55.3	−.5	79	5	66	30	20	44	39	46	38	62	1.29	−.5	7	16.0	s.	58	s.	13	9	10	11	5.4	.0	.0
Del Rio	960	63	71	28.86	29.83	−.06	70.3	−.3	93	15	80	48	8	61	35	60	53	61	1.81	.0	6	11.0	e.	29	e.	13	8	6	16	6.0	.0	.0
Roswell	3,566	75	85	26.25	29.83	−.02	57.6	−3.0	84	12	70	37	20	46	40	46	32	46	3.95	+3.1	7	9.6	s.	36	w.	1	14	7	9	4.4	.0	.0
Southern Plateau							53.5	−3.3										55	1.43	+1.0									4.9		
El Paso [2]	3,778	82	101	26.07	29.81	−.02	60.2	−3.2	83	30	72	39	20	48	37	45	30	40	1.49	+1.2	6	10.4	w.	35	w.	12	17	9	4	3.2	.0	.0
Albuquerque [1]	4,972	5	34	24.95	29.83	------	50.6	−3.4	76	30	63	30	19	39	39	40	29	52	1.20	+.6	7	10.8	se.	40	s.	12	5	8	17	7.1	T	.0
Santa Fe [2]	7,013	38	53	23.13	29.87	+.03	43.8	−2.9	65	30	54	25	19	34	29	36	29	62	1.52	+.5	9	7.2	e.	26	s.	12	4	3	23	7.6	3.6	.0
Flagstaff	6,907	10	59	------	------	------	38.4	−3.8	62	25	49	18	14	27	34	33	28	71	3.12	------	13	9.1	sw.	27	nw.	6	3	20	7	6.0	14.5	.0
Phoenix [2]	1,107	39	87	28.70	29.84	−.03	63.0	−4.0	90	29	76	41	19	50	37	51	41	56	2.12	+1.7	7	7.1	e.	25	nw.	18	17	6	7	4.0	.0	.0
Yuma	142	9	54	29.71	29.86	−.03	67.0	−2.5	94	28	80	45	19	54	36	54	42	47	.28	+.2	2	5.7	w.	26	w.	17	20	6	4	2.6	.0	.0
Independence	3,957	[5]	21	25.85	29.88	−.02	51.8	−3.2	77	28	64	30	17	39	34	40	26	---	1.99	+1.9	5	5.8	nw.	--	------	---	10	12	8	3.6	1.0	.0
Middle Plateau							46.0	−2.4										59	1.81	+0.8									6.3		
Reno [2]	4,527	61	76	25.37	29.92	−.05	46.4	−1.1	73	28	58	26	6	34	35	36	26	55	.48	.0	6	7.9	w.	27	w.	23	11	10	9	5.0	1.4	.0
Tonopah	6,090	12	20	23.93	29.88	------	42.0	------	67	28	52	19	5	32	29	35	28	---	1.02	------	9	------	se.	----	------	---	3	18	9	----	10.4	.0
Winnemucca	4,339	5	56	25.53	29.91	−.05	44.8	−1.9	75	29	58	22	19	31	42	37	29	61	1.04	+.2	11	7.6	ne.	34	sw.	4	4	9	17	6.9	.4	.0
Modena	5,473	10	46	------	------	------	41.4	−4.6	69	29	54	20	19	29	37	---	---	---	2.79	+1.9	15	9.6	sw.	34	sw.	16	4	14	12	6.5	4.4	.0
Salt Lake City [1]	4,357	86	210	25.50	29.88	−.04	48.2	−1.4	76	29	58	30	18	39	31	40	34	65	3.42	+1.4	17	7.6	nw.	32	se.	10	7	12	11	6.1	8.4	.0
Grand Junction	4,602	60	68	25.26	29.83	−.05	49.2	−3.2	70	30	59	30	19	40	30	40	31	55	1.31	+.5	12	6.9	se.	32	w.	5	2	11	17	7.1	.9	.0
Northern Plateau							52.5	+2.7										61	0.85	−0.2									5.6		
Baker [2]	3,471	36	54	26.36	29.94	−.06	46.2	+1.0	75	30	58	24	19	34	36	39	34	71	1.33	+.2	11	6.9	s.	22	n.	13	10	6	14	5.9	T	.0
Boise [1]	2,739	5	49	27.06	29.89	−.09	50.1	------	80	29	62	31	19	38	34	42	33	58	1.35	------	9	10.6	nw.	34	nw.	13	11	7	12	5.4	T	.0
Pocatello [1]	4,478	5	31	25.36	29.89	−.05	44.0	------	71	29	56	20	19	32	38	38	31	67	2.26	------	13	8.3	sw.	29	s.	4	9	9	12	6.1	2.4	.0
Spokane [1]	1,929	27	42	27.88	29.92	−.07	51.8	+3.4	80	29	65	28	18	39	37	44	35	60	.32	−.8	6	6.7	ne.	26	sw.	15	10	7	13	5.7	.0	.0
Walla Walla	991	57	65	28.86	29.91	−.10	56.2	+3.1	79	22	66	36	18	46	32	---	---	---	.98	−.5	8	6.1	s.	22	w.	5	12	3	15	5.5	.0	.0
Yakima	1,076	58	67	28.77	29.92	------	55.8	+3.3	79	22	68	35	5	44	35	46	34	51	.76	+.3	8	6.5	nw.	25	nw.	15	13	7	10	5.0	.0	.0
North Pacific Coast Region							53.3	+3.7										72	1.86	−1.2									6.2		
North Head	211	5	56	29.76	29.99	−.06	51.6	+4.1	79	25	57	40	15	47	32	48	45	80	1.81	−2.3	8	16.4	n.	49	s.	4	5	10	15	6.7	.0	.0
Seattle [2]	125	90	321	29.83	29.97	−.06	55.0	+5.6	83	26	64	40	15	46	33	48	42	69	1.87	−.5	12	7.8	n.	32	sw.	5	8	7	15	6.1	.0	.0
Tacoma	194	172	201	29.77	29.97	−.06	53.8	+5.1	82	26	62	39	18	45	34	---	---	---	1.55	−1.2	12	7.4	n.	32	s.	4	6	9	15	6.2	.0	.0
Tatoosh Island	86	9	61	29.88	29.98	−.02	50.4	+4.3	62	25	54	41	16	46	14	48	45	81	2.50	−3.1	11	11.8	w.	45	w.	14	8	7	15	6.2	.0	.0
Medford	1,329	29	58	28.55	29.96	------	52.2	+.1	80	24	66	29	18	38	44	45	37	64	1.64	+.4	12	------	nw.	----	------	---	7	10	13	6.2	T	.0
Portland, Oreg. [3]	154	68	106	29.80	29.97	−.09	56.4	+4.6	82	25	66	41	17	47	32	49	43	70	1.56	−1.3	11	5.6	nw.	19	sw.	4	6	8	16	6.3	.0	.0
Roseburg	510	45	76	29.43	29.98	−.09	53.4	+2.4	82	25	65	33	18	42	40	46	40	68	2.09	−.2	12	4.5	n.	19	sw.	5	9	10	11	5.6	.0	.0
Middle Pacific Coast Region							55.7	0.0										70	5.02	+2.8									5.6		
Eureka	60	72	88	29.95	30.02	−.09	51.8	+1.9	60	8	57	40	18	47	18	48	45	80	4.49	+1.2	14	9.3	n.	32	n.	11	9	1	20	6.9	.0	.0
Redding [1]	722	20	34	29.16	29.93	------	57.4	−2.4	83	24	68	40	10	47	34	48	39	57	6.78	+4.2	10	8.3	nw.	29	s.	4	12	6	12	5.4	.0	.0
Sacramento [2]	66	92	115	29.87	29.94	−.07	57.8	−.3	84	24	68	42	18	48	32	51	46	70	4.76	+3.2	10	8.2	s.	30	se.	4	13	11	6	4.3	.0	.0
San Francisco	155	112	132	29.79	29.96	−.09	55.8	+.8	70	11	61	44	10	51	22	50	47	75	4.05	+2.4	10	9.5	w.	29	se.	4	9	8	13	6.0	.0	.0
South Pacific Coast Region							59.6	+0.2										68	2.88	+2.0									5.3		
Fresno [1]	327	5	35	29.60	29.95	−.04	58.8	−1.4	86	25	71	36	18	46	35	51	44	65	2.61	+1.7	6	6.4	nw.	29	nw.	4	12	8	10	4.9	.0	.0
Los Angeles	338	223	250	29.58	29.94	−.05	59.1	−.3	79	21	67	46	11	51	27	52	46	66	2.67	+1.6	8	7.7	w.	31	nw.	5	12	6	12	5.4	.0	.0
San Diego [1]	87	20	55	29.86	29.95	−.04	60.9	+2.4	77	20	68	46	19	53	28	55	50	72	3.35	+2.6	10	7.7	w.	29	sw.	11	12	5	13	5.6	.0	.0
West Indies																															
San Juan, P. R.	82	10	54	29.87	29.96	------	78.2	+1.6	91	9	83	70	14	73	18	----	----	---	5.84	+1.5	14	10.8	e.	26	e.	1	6	14	10	6.1	.0	.0
Panama Canal																															
Balboa Heights	118	6	92	------	[4]29.81	−.02	83.6	+2.0	96	19	92	71	14	75	21	----	----	[5]83	4.74	+1.9	8	7.2	nw.	25	nw.	20	0	29	1	5.4	.0	.0
Cristobal	36	6	97	------	[4]29.82	−.03	84.0	+2.2	94	29	88	77	1	80	15	77	75	[5]79	.36	−3.7	9	11.8	n.	24	n.	17	2	13	15	7.2	.0	.0
Alaska																															
Fairbanks	454	11	87	[4]29.17	[4]29.69	------	37.5	+8.8	60	29	49	11	1	26	39	33	26	63	.87	+.6	4	6.1	e.	26	sw.	16	2	12	16	7.5	8.4	.0
Juneau	80	96	116	[4]29.81	[4]29.90	------	45.2	+4.8	62	25	51	34	1	40	22	42	37	75	5.01	−.3	20	6.7	s.	26	se.	3	0	4	26	9.1	.0	.0
Nome	22	5	59	------	------	------	----	----	---	---	---	---	---	---	---	---	---	---	----	----	---	------	---	---	---	---	---	---	---	----	---	---
Hawaiian Islands																															
Honolulu	38	86	100	30.01	30.05	------	74.7	+1.7	82	22	79	67	4	70	14	66	62	67	.47	−1.6	8	9.5	e.	26	e.	9	[6]8	18	[6]4	4.9	.0	.0

[1] Data are airport records.
[2] Barometric and hygrometric data from airport, other data from city office records.
[3] Observations taken hourly.
[4] Pressure not reduced to a mean of 24 hours.
[5] Barometric data from airport records, other data from city office records.
[6] Wind, and clear, partly cloudy, and cloudy data from city office records; other data from airport.

NOTE.—Except as indicated by notes 1, 2, 5, and 6, data in table are city office records.

SOLAR RADIATION AND SUNSPOT DATA FOR APRIL 1941

SOLAR RADIATION OBSERVATIONS

By HELEN CULLINANE

Measurements of solar radiant energy received at the surface of the earth are made at 9 stations maintained by the Weather Bureau and at 12 cooperating stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Madison, Wis.; Lincoln, Nebr., and Albuquerque, N. Mex.) and at the Blue Hill Observatory at Harvard University. Occasional observations of sky polarization are taken at the Weather Bureau station at Madison and at Blue Hill Observatory.

The geographic coordinates of the stations, and descriptions of the instrumental equipment, station exposures, and methods of observation, together with summaries of the data obtained, up to the end of 1936, will be found in the MONTHLY WEATHER REVIEW, December 1937, pp. 415 to 441; further descriptions of instruments and methods are given in Weather Bureau Circular Q.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parentheses). At Lincoln, Madison, Albuquerque, and Blue Hill the observations are obtained with a recording thermopile, checked by observations with a Smithsonian silver-disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 7:30 a. m. and at 1:30 p. m. (75th meridian time).

Table 2 contains the average amounts of radiation received daily on a horizontal surface from both sun and sky during each week, their departures from normal and the accumulated departures since the beginning of the year. The values at most of the stations are obtained from the records of the Eppley pyrheliometer recording on either a microammeter or a potentiometer.

Direct solar radiant energy was considerably below normal at both Blue Hill and Madison, while the few measurements at Lincoln were considerably above normal.

Total solar and sky radiation was considerably below normal at Lincoln, Fresno, and Fairbanks, and excessive at Washington, Chicago, Blue Hill, and Friday Harbor.

Polarization observations made at Madison on 5 days give a mean of 59 percent, and a maximum of 59 percent. The mean is exactly equal to the normal, while the maximum is considerably below.

Pyrheliometric apparatus for the measurement of the intensity of direct solar radiation at normal incidence has just been installed at Albuquerque and Lincoln.

TABLE 1.—*Solar radiation intensities during April 1941*

[Gram-calories per minute per square centimeter of normal surface]

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
LINCOLN, NEBR.											
Apr. 23	5.8					1.46					5.2
Apr. 24	4.6			1.19	1.28						5.8
Means				(1.19)	(1.28)	(1.46)					
Departures				+.21	+.10	+.15					
MADISON, WIS.											
Apr. 2	3.6	0.69	0.84								4.2
Apr. 22	4.2		.76	1.02	1.18	1.38					4.8
Apr. 23	6.0		.90								4.6
Apr. 24	4.4		.94	1.04	1.21	1.46					4.4
Apr. 25	4.2	.73	.80	.91	1.08	1.41					4.6
Apr. 28	7.9				.88	1.27					6.5
Apr. 29	6.8	.42	.55	.68	.86	1.11					6.8
Means		.61	.80	.91	1.04	1.33					
Departures		−.18	−.12	−.14	−.16	−.10					

As a result of the recalibration work now being conducted, new factors for the instruments at La Jolla, Calif., Albuquerque, N. Mex., New Orleans, La., and Washington, D. C., make the following changes necessary in table 2.

Week beginning	La Jolla, Calif.		Washington, D. C.		New Orleans, La.		Albuquerque, N. Mex.	
	Cal.	Departure	Cal.	Departure	Cal.	Departure	Cal.	Departure
Jan. 1	230	−9	174	+5				
Jan. 8	207	−51	194	+49				
Jan. 15	297	+16	137	−19				
Jan. 22	210	−81	94	−182				
Jan. 29	348	+66	194	−8			284	−11
Feb. 5	302	−15	262	+48			360	+19
Feb. 12	243	−60	230	+4			360	+13
Feb. 19	316	−54	353	+95			307	−60
Feb. 26	341	−67	269	−11	383	+112	496	+69
Mar. 5	428	+15	264	−46	315	−9	458	+108
Mar. 12	379	−31	376	+56	276	−71	388	−20
Mar. 19	506	+69	357	+13	250	−106	397	−52
Mar. 26	470	−16	377	+30	480	+147	614	+89

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Cambridge	Fairbanks	Twin Falls	La Jolla	Newport	New Orleans	Riverside	Blue Hill	Albuquerque	Friday Harbor
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Apr. 2	379	330	98	290	496	480	393	306	461	586	401	495	506	394	551	271
Apr. 9	482	400	333	407	550	427	474	310	355	376	500	559	302	481	594	458
Apr. 16	492	347	438	303	636	651	534	316	536	629	551	339	616	527	626	602
Apr. 23	508	564	550	581	601	609	376	376	552	354	400	376	473	379	496	561
DEPARTURES FROM WEEKLY NORMALS																
Apr. 2	+9	−38	−300	−3	+159	−37	−29	−29	+28	+38	−20	+106	+19	+14	−27	−60
Apr. 9	+85	−2	−107	+63	+208	−136	+5	−50	−103	−70	+12	+134	−162	+122	+3	+112
Apr. 16	+77	−50	−14	−32	+269	+51	+54	−51	+50	+119	+51	−68	+73	+115	+40	+138
Apr. 23	+59	+126	+107	+200	+170	+33	−37	+2	+43	−145	−66	−16	+13	−56	−100	+67
ACCUMULATED DEPARTURES ON APR. 30, 1941																
	+1,848	+1,372	−5,529	+3,689	+10,689	−3,241	−42	−1,288	+1,925	−1,932	+14	+2,835	−3,976	+833	−525	+5,250

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR MARCH 1941

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Mar. 1...	11 36	8039	−51	272	+12	54	121	4	G	U. S. Naval.
		8034	−2	321	+11	18	218	2		
		8037	+12	335	+8	19	48	3		
		8032	+32	355	+16	39	436	12		
				(323)	(−7)		823	21		
Mar. 2...	12 11	8039	−37	272	+12	42	97	4	F	Do.
		8034	+11	320	+10	21	206	1		
		8037	+22	331	+8	27	12	1		
		8032	+46	355	+15	50	291	10		
				(309)	(−7)		606	16		
Mar. 3...	11 13	(*)	−49	248	+12	52	121	8	F	Do.
		8039	−27	270	+12	33	12	2		
		(*)	−19	278	+11	26	61	2		
		8034	+23	320	+10	28	242	4		
		(*)	+55	352	+17	60	6	1		
		8032	+59	356	+15	62	291	6		
				(297)	(−7)		733	23		
Mar. 4...	11 47	8041	−58	225	+13	61	48	5	G	Do.
		(*)	−50	233	+15	55	24	3		
		8040	−35	248	+12	40	97	6		
		(*)	−6	277	+11	19	248	6		
		8034	+37	320	+9	41	242	9		
		8032	+73	356	+15	75	242	5		
				(283)	(−7)		701	34		
Mar. 5...	12	8041	−44	226	+12	48	97	4	G	Do.
		8040	−23	247	+12	30	24	1		
		8040	−19	251	+11	26	48	2		
		(*)	−11	259	−10	12	24	4		
		8039	−1	269	+12	19	24	1		
		8039	+9	279	+12	21	36	1		
		8034	+50	320	+9	53	242	8		
				(270)	(−7)		495	21		
Mar. 6...	12 9	8041	−30	227	+12	36	73	2	F	Do.
		8040	−9	248	+12	21	36	7		
		8040	−4	253	+10	17	36	2		
		8043	+3	260	+12	20	24	3		
		8039	+12	269	+12	23	24	4		
		8042	+62	319	−6	62	24	1		
		8034	+64	321	+9	66	242	3		
				(257)	(−7)		459	22		
Mar. 7...	11 26	8041	−18	226	+11	25	48	4	F	Mt. Wilson.
		8040	+8	252	+11	20	73	8		
		8043	+17	261	+12	25	36	8		
		8042	+76	320	−6	76	36	2		
		8034	+79	323	+9	79	194	1		
				(244)	(−7)		387	23		
Mar. 8...	11 36	8040	+22	253	+10	28	48	4	F	Do.
		8043	+30	261	+12	35	194	10		
				(231)	(−7)		242	14		
Mar. 9...	11 47	8044	−73	144	−7	73	97	4	VG	U. S. Naval.
		8040	+37	254	+9	40	12	3		
		8043	+44	261	+10	48	376	14		
				(217)	(−7)		485	21		
Mar. 10...	12 2	8044	−59	145	−7	59	194	6	G	Do.
		8045	−26	178	+16	35	12	4		
		8043	+57	261	+10	60	436	10		
				(204)	(−7)		642	20		
Mar. 11...	13 15	8046	−49	141	+15	54	12	2	G	Do.
		8044	−45	145	−7	45	194	12		
		8045	−12	178	+15	26	230	16		
		8043	+71	261	+10	73	485	6		
				(190)	(−7)		921	36		

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR MARCH 1941—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Mar. 12...	10 58	8046	−36	142	+15	42	12	2	VG	U. S. Naval.
		8044	−32	146	−7	32	109	10		
		8045	+1	179	+15	22	218	18		
		8043	+82	260	+11	84	194	3		
				(178)	(−7)		533	33		
Mar. 13...	11 48	8044	−19	146	−7	19	121	7	P	Do.
		8045	+14	179	+15	26	315	12		
				(165)	(−7)		436	19		
Mar. 14...	11 27	8049	−80	72	−11	80	48	1	VG	Do.
		(*)	−74	78	−3	74	12	1		
		8047	−64	88	+14	68	6	1		
		8044	−11	141	−9	11	12	1		
		8044	−2	150	−7	2	24	5		
		8045	+22	174	+18	34	48	16		
		8045	+30	182	+15	37	170	7		
				(152)	(−7)		320	32		
Mar. 15...	11 30	8049	−67	71	−11	67	145	1	G	Do.
		8048	−63	75	+15	65	48	4		
		8047	−49	89	+14	53	6	1		
		8044	+12	150	−7	12	12	3		
		8045	+37	175	+18	44	36	16		
		8045	+45	183	+14	50	145	3		
				(138)	(−7)		392	28		
Mar. 16...	11 31	8051	−80	45	+7	81	6	1	G	Do.
		8050	−79	46	−17	79	242	3		
		8049	−53	72	−10	53	97	1		
		8048	−50	75	+16	55	48	2		
		8047	−38	87	+13	43	97	8		
		8044	+26	151	−7	26	12	1		
		8045	+52	177	+17	57	48	6		
		8045	+59	184	+14	62	85	3		
				(125)	(−7)		635	25		
Mar. 17...	11 9	8051	−67	45	+7	69	24	2	G	Mt. Wilson.
		8050	−65	47	−16	65	291	4		
		8049	−40	72	−11	40	85	1		
		8048	−35	77	+16	42	6	6		
		8047	−25	87	+12	31	170	27		
		8052	−16	96	+15	28	6	1		
		8045	+65	177	+16	68	24	3		
		8045	+73	185	+12	75	12	2		
				(112)	(−7)		618	46		
Mar. 18...	11 15	8051	−54	45	+7	56	12	3	F	U. S. Naval.
		8050	−51	48	−16	51	242	3		
		8049	−27	72	−11	27	73	2		
		8047	−11	88	+12	22	436	20		
		8052	−3	96	+14	22	36	5		
				(99)	(−7)		799	33		
Mar. 19...	10 44	8054	−41	45	+13	45	24	3	G	Mt. Wilson.
		8050	−37	49	−16	38	242	4		
		8049	−13	73	−11	14	73	1		
		8047	+3	89	+12	19	533	40		
		8052	+11	97	+14	24	12	1		
		8053	+65	151	−9	65	12	1		
				(86)	(−7)		896	50		
Mar. 20...	12 15	(*)	−26	46	+6	29	6	1	G	U. S. Naval.
		8054	−25	47	+13	32	18	1		
		8050	−24	48	−15	25	255	6		
		8049	+1	73	−11	4	61	1		
		8047	+13	86	+12	23	473	30		
		8052	+27	99	+14	34	12	1		
				(72)	(−7)		825	40		
Mar. 21...	11 58	(*)	−23	36	−19	26	12	5	VG	Do.
		8050	−13	46	−13	14	24	4		
		8054	−11	48	+13	23	12	5		
		8050	−9	50	−15	12	145	6		
		8049	+13	72	−11	13	48	1		
		8047	+21	80	+11	27	12	1		
		8047	+29	88	+12	35	461	30		
		8052	+42	101	+14	30	12	1		
				(59)	(−7)		726	53		

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR MARCH 1941—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Mar. 22	11 23	8056	−87	319	+9	88	6	1	G	Mt. Wilson.
		8050	−10	36	−19	16	24	8		
		8050	+ 1	47	−18	11	6	1		
		8050	+4	50	−15	9	194	5		
		8054	+4	50	+13	20	6	2		
		8055	+13	59	+11	22	6	1		
		8049	+28	74	−12	29	48	1		
		8047	+42	88	+10	45	412	27		
		8052	+58	104	+14	61	12	3		
				(46)	(−7)		714	49		
Mar. 23	11 7	8056	−73	320	+9	75	97	1	F	Do.
		8050	+3	36	−18	12	36	3		
		8057	+7	40	+4	13	12	2		
		8050	+19	52	−15	21	194	5		
		8049	+43	76	−12	43	48	1		
		8047	+57	90	+12	60	267	23		
				(33)	(−7)		654	35		
Mar. 24	10 39	8058	−64	316	−8	64	6	1	F	Do.
		8056	−58	322	+8	60	97	1		
		8050	+31	51	−15	32	121	4		
		8049	+54	74	−11	54	12	1		
		8047	+70	90	+11	72	194	11		
				(20)	(−7)		430	18		
Mar. 25	10 53	8058	−54	313	−10	54	48	1	VG	U. S. Naval.
		8056	−44	323	+8	46	121	3		
		8056	−41	326	+9	44	6	1		
		8059	−27	340	+6	30	6	2		
		(*)	−16	351	+15	27	6	1		
		8050	+44	51	−15	44	61	7		
		8049	+68	75	−10	68	24	3		
		8047	+82	89	+11	84	145	4		
				(7)	(−7)		417	22		
Mar. 26	11 26	8058	−41	312	−10	41	48	1	F	Do.
		8056	−30	323	+8	34	121	1		
		8060	−26	327	−7	26	6	2		
		8059	−13	340	+6	18	61	3		
		8050	+57	50	−15	57	48	3		
				(353)	(−7)		284	10		
Mar. 27	10 47	8062	−73	267	+11	75	145	2	VG	Do.
		8058	−27	313	−9	27	24	5		
		8056	−17	323	+8	24	145	2		
		8061	−9	331	+1	12	24	4		
		(*)	−7	333	−21	15	6	2		
		8059	+1	341	+6	13	24	5		
		8050	+72	52	−15	78	12	1		
				(340)	(−7)		380	21		
Mar. 28	13 54	(*)	−65	261	−19	66	12	2	F	Do.
		8062	−60	266	+11	63	97	3		
		(*)	−25	301	−15	26	12	4		
		8056	−3	323	+8	16	97	1		
		8061	+5	331	+1	9	24	5		
		8059	+14	340	+7	21	48	6		
				(326)	(−7)		290	21		
Mar. 29	11 19	8062	−46	268	+11	50	85	2	G	Do.
		8056	+10	324	+8	18	97	5		
		8059	+28	342	+7	32	24	3		
				(314)	(−7)		206	10		
Mar. 30	12 32	8062	−31	269	+10	35	48	2	F	Do.
		(*)	+1	301	−15	9	6	2		
		8056	+23	323	+8	28	97	5		
		8059	+41	341	+7	44	12	2		
				(300)	(−7)		163	11		
Mar. 31	11 19	8062	−18	269	+10	25	24	1	G	Do.
		(*)	+2	289	−1	6	48	8		
		8056	+36	323	+8	40	97	6		
		8059	+54	341	+7	56	12	2		
				(287)	(−7)		181	17		

Mean daily area for 31 days = 529.

*=Not numbered.
VG=very good; G=good; F=fair; P=poor.

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR APRIL 1941

[Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.), Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Apr. 2	11 37	8062	+7	268	+11	11	24	3	G	U. S. Naval.
		(*)	+31	292	−1	32	48	6		
		8056	+63	324	+8	66	24	2		
				(261)	(−6)		96	11		
Apr. 3	11 26	(*)	+44	292	−1	46	12	2	G	Do.
				(248)	(−6)		12	2		
Apr. 5	16 6	8063	−48	171	−7	48	48	4	G	Do.
				(219)	(−6)		48	4		
Apr. 6	10 55	8065	−85	123	−10	85	97	1	F	Mount Wilson.
		8065	−80	128	−8	80	48	1		
		8063	−37	171	−7	37	36	1		
		8064	+22	230	+8	26	6	2		
				(208)	(−6)		187	5		
Apr. 7	11 34	8067	−80	115	−9	80	145	4	VG	U. S. Naval.
		8065	−69	126	−10	69	145	8		
		(*)	−66	129	−20	67	24	2		
		8066	−52	143	−4	53	121	6		
		8063	−23	172	−7	23	48	2		
				(195)	(−6)		483	22		
Apr. 8	13 47	8067	−65	116	−9	65	145	4	G	Do.
		8065	−55	126	−10	55	145	9		
		8066	−38	143	−4	38	145	8		
		8063	−10	171	−9	10	24	8		
		8063	−8	173	−7	8	24	2		
		8068	−1	180	+11	17	24	2		
				(181)	(−6)		507	33		
Apr. 9	11 4	8067	−54	115	−9	54	97	3	G	Do.
		8065	−43	126	−11	43	145	8		
		8066	−24	145	−4	24	97	6		
		8063	+4	173	−7	4	24	1		
		8068	+10	179	+12	20	24	3		
				(169)	(−6)		387	21		
Apr. 10	10 58	(*)	−51	105	−10	51	48	5	VG	Do.
		8067	−40	116	−9	40	97	5		
		8065	−30	126	−11	30	145	20		
		8066	−11	145	−4	12	48	5		
		(*)	+56	212	−3	57	48	4		
				(156)	(−6)		386	39		
Apr. 11	11 32	(*)	−42	100	−10	42	6	4	VG	Do.
		(*)	−37	105	−9	37	48	5		
		(*)	−33	109	−11	33	36	3		
		8067	−27	115	−9	27	97	11		
		8065	−17	125	−11	18	145	22		
		8066	+5	147	−4	5	24	2		
		(*)	+70	212	−2	72	24	3		
				(142)	(−6)		380	50		
Apr. 12	10 53	(*)	−68	61	−5	68	6	1	F	Do.
		(*)	−21	108	−10	21	73	10		
		8067	−14	115	−9	15	73	6		
		8065	−3	126	−11	5	145	14		
		8066	+18	147	−5	18	36	2		
				(129)	(−6)		333	33		
Apr. 13	12 52	(*)	−14	101	+11	23	24	1	P	Do.
		8067	−1	114	−9	4	73	3		
		8065	+11	126	−11	12	48	1		
				(115)	(−6)		145	5		
Apr. 14	11 30	(*)	−20	83	−9	20	24	3	G	Do.
		(*)	−2	101	+12	19	24	3		
		8067	+15	118	−9	16	24	2		
				(103)	(−6)		72	8		

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR APRIL 1941—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Apr. 15	10 22	(*)	−5	85	−9	6	12	4	G	U. S. Naval.
		(*)	+18	108	−9	19	12	3		
		8067	+28	118	−8	28	24	2		
				(90)	(−6)		48	9		
Apr. 16	11 42	8069	+5	81	+9	15	12	2	F	Do.
		8067	+41	117	−8	41	73	7		
				(76)	(−5)		85	9		
Apr. 17	11 7	8071	−62	1	+15	66	36	1	F	Do.
		8067	+54	117	−8	54	145	14		
		8070	+65	128	−13	65	12	3		
				(63)	(−5)		193	18		
Apr. 18	11 15	8072	−80	330	−8	80	194	5	G	Do.
		8071	−47	3	+15	51	48	5		
		8067	+68	118	−8	68	170	12		
				(50)	(−5)		412	22		
Apr. 19	10 42	8072	−68	329	−8	68	485	16	G	Do.
		(*)	+19	56	−10	20	12	1		
		8067	+80	117	−9	80	182	7		
				(37)	(−5)		679	24		
Apr. 20	11 24	8072	−57	326	−9	58	194	20	VG	Do.
		8072	−50	333	−7	50	436	1		
				(23)	(−5)		630	21		
Apr. 21	12 11	8072	−45	325	−9	46	194	16	G	Do.
		8072	−37	333	−7	37	436	1		
				(10)	(−5)		630	17		
Apr. 22	12 24	8072	−31	325	−9	31	97	15	G	Do.
		8072	−25	331	−7	25	436	1		
				(356)	(−5)		533	16		
Apr. 23	10 53	8072	−18	326	−9	19	97	16	G	Do.
		8074	−15	329	+4	18	12	3		
		8072	−12	332	−7	13	485	2		
		8073	−3	341	+3	8	6	1		
				(344)	(−5)		600	22		
Apr. 25	11 38	8072	+10	327	−9	11	73	11	VG	Do.
		8074	+11	328	+4	15	6	3		
		8072	+15	332	−7	15	412	6		
		8073	+24	341	+3	25	145	7		
				(317)	(−5)		636	27		
Apr. 26	11 21	8075	−80	224	−1	80	291	2	G	Do.
		8072	+22	326	−7	22	12	3		
		8074	+25	329	+5	28	12	4		
		8072	+28	332	−7	28	388	5		
		8073	+37	341	+3	39	170	13		
				(304)	(−5)		873	27		
Apr. 27	11 44	8075	−67	224	−1	67	291	5	G	Do.
		8076	−57	234	−8	57	61	1		
		8072	+42	333	−6	42	388	5		
		8073	+52	343	+4	54	85	8		
				(291)	(−5)		825	19		

POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR APRIL 1941—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1941	h m		°	°	°	°				
Apr. 28	10 45	(*)	−63	215	−3	63	6	1	VG	U. S. Naval.
		8075	−52	226	−1	52	242	6		
		8077	+2	280	+12	16	18	2		
		8072	+57	335	−6	57	388	5		
		8073	+66	344	+4	67	73	6		
				(278)	(−4)		727	20		
Apr. 29	12 29	8075	−38	226	−1	38	242	6	G	Do.
		8077	+16	280	+13	23	48	3		
		8072	+70	334	−5	70	339	3		
				(264)	(−4)		629	12		
Apr. 30	11 48	(*)	−85	166	+17	85	97	1	G	Do.
		8075	−24	227	0	24	194	6		
		(*)	−5	246	−11	9	6	2		
		8077	+30	281	+13	34	42	4		
		(*)	+46	297	−11	46	24	4		
		8072	+85	336	−5	85	242	2		
				(251)	(−4)		605	19		

Mean daily area for 27 days_____=413.

*=Not numbered.
VG=very good; G=good; F=fair; P=poor.

PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR MARCH 1941

[Based on observations at Zurich and Locarno. Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich]

March 1941	Relative numbers	March 1941	Relative numbers	March 1941	Relative numbers
1	46	11	*Mc* 46	21	76
2	*a* 49	12	*a* 60	22	**a* 57
3	*Ec* 50	13	37	23	**d* 50
4	*Ec* 48	14	37	24	39
5	41	15	37	25	47
6	45	16	*Ecd* 48	26	*40
7	*Mac* 47	17	61	27	43
8	31	18	65	28	*a* 40
9	*d* 42	19	*b* 70	29	34
10	40	20	64	30	17
				31	

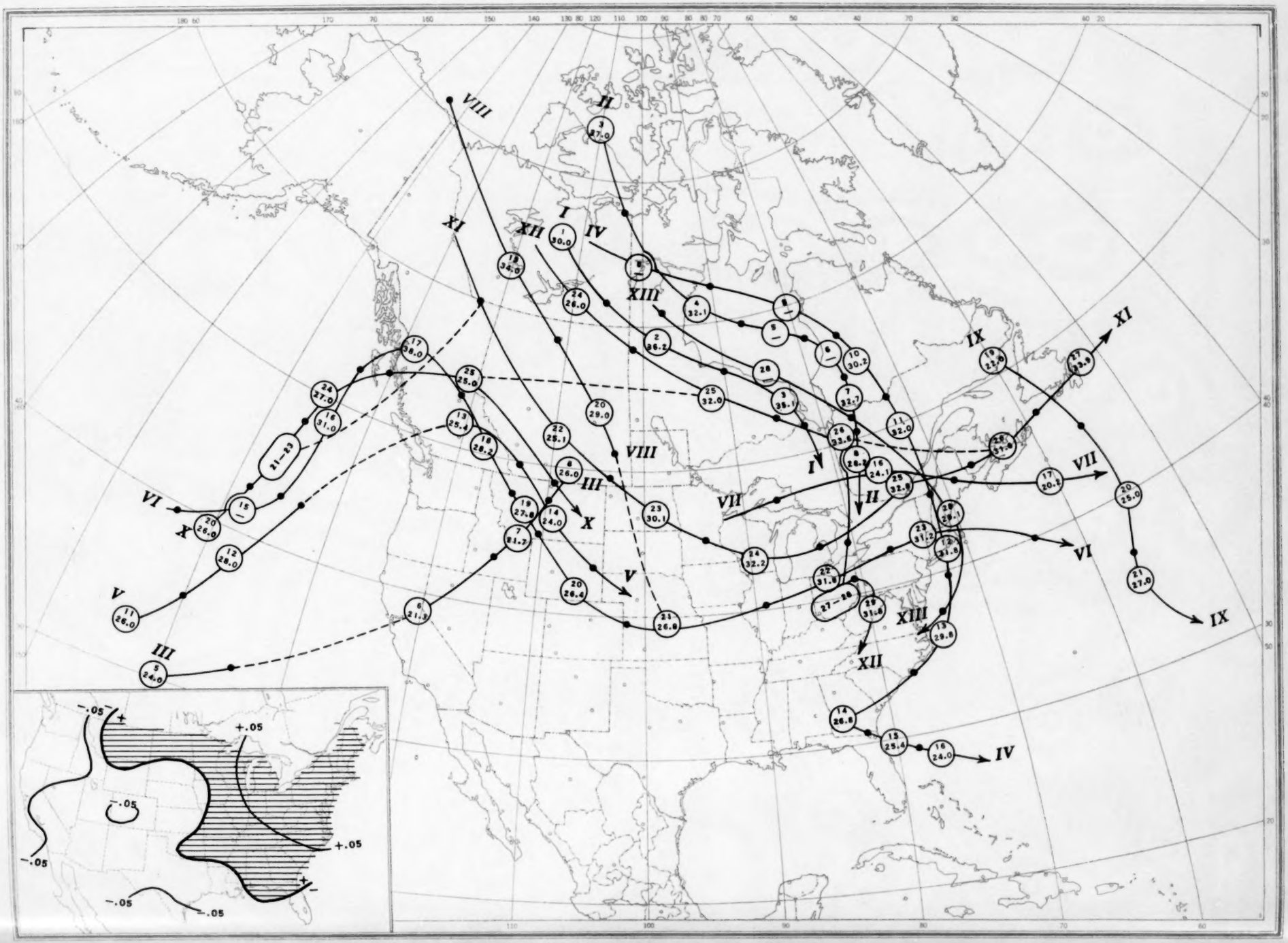
Mean, 30 days=46.9

*=Observed at Locarno.
a=Passage of an average-sized group through the central meridian.
b=Passage of a large group through the central meridian.
c=New formation of a group developing into a middle-sized or large center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.
d=Entrance of a large or average-sized center of activity on the east limb.

Chart I. Departure (°F.) of the Mean Temperature from the Normal and Wind Direction

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, April 1941

Chart II. Tracks of Centers of Anticyclones, April 1941. (Inset) Departure of Monthly Mean Pressure from Normal

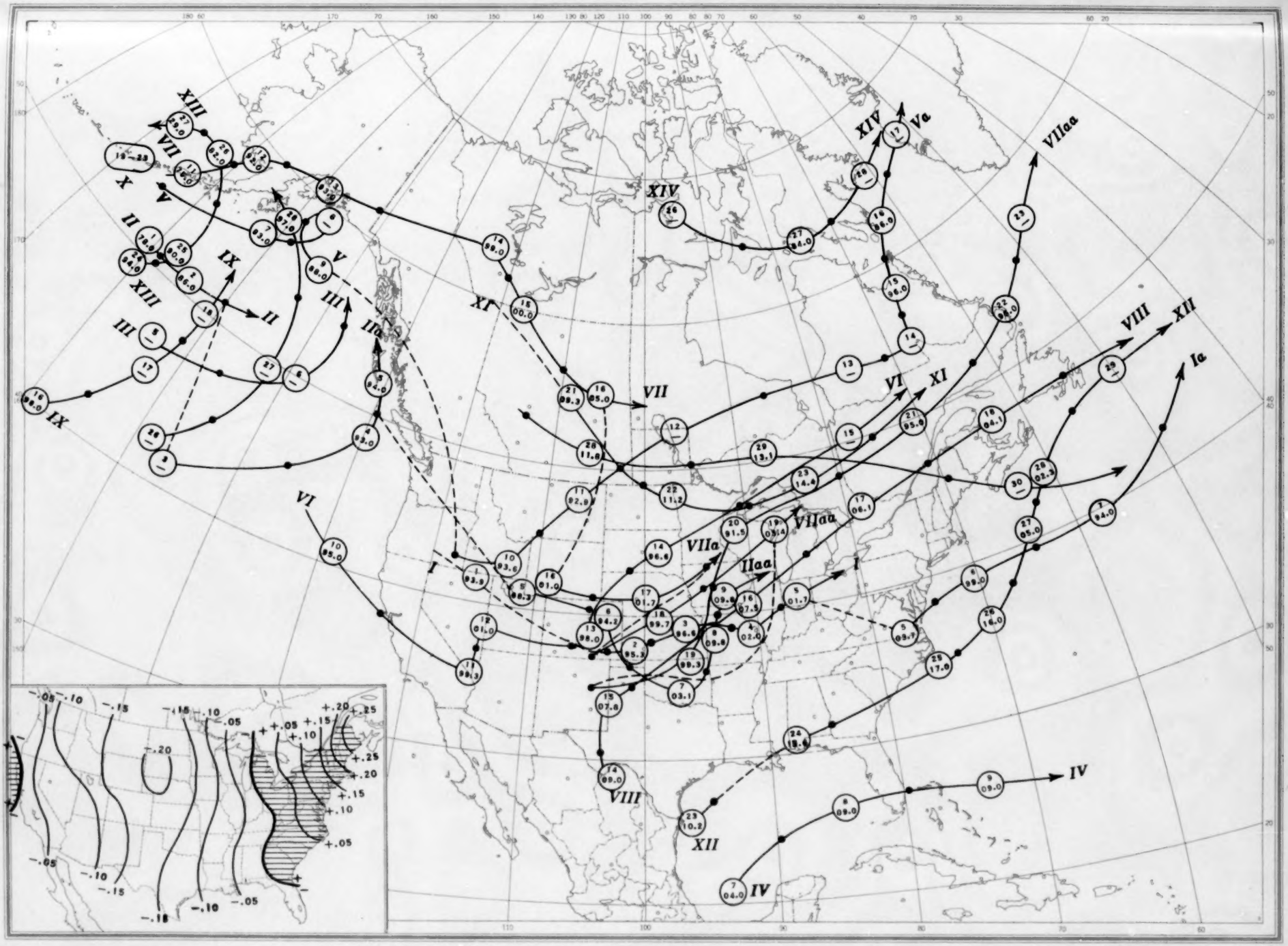


Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time).

Chart III. Tracks of Centers of Cyclones, April 1941. (Inset) Change in Mean Pressure from Preceding Month

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time).

Chart III. Tracks of Centers of Cyclones, April 1941. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time).

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, April 1941

Chart V. Total Precipitation, Inches, April 1941. (Inset) Departure of Precipitation from Normal

Chart V. Total Precipitation, Inches, April 1941. (Inset) Departure of Precipitation from Normal

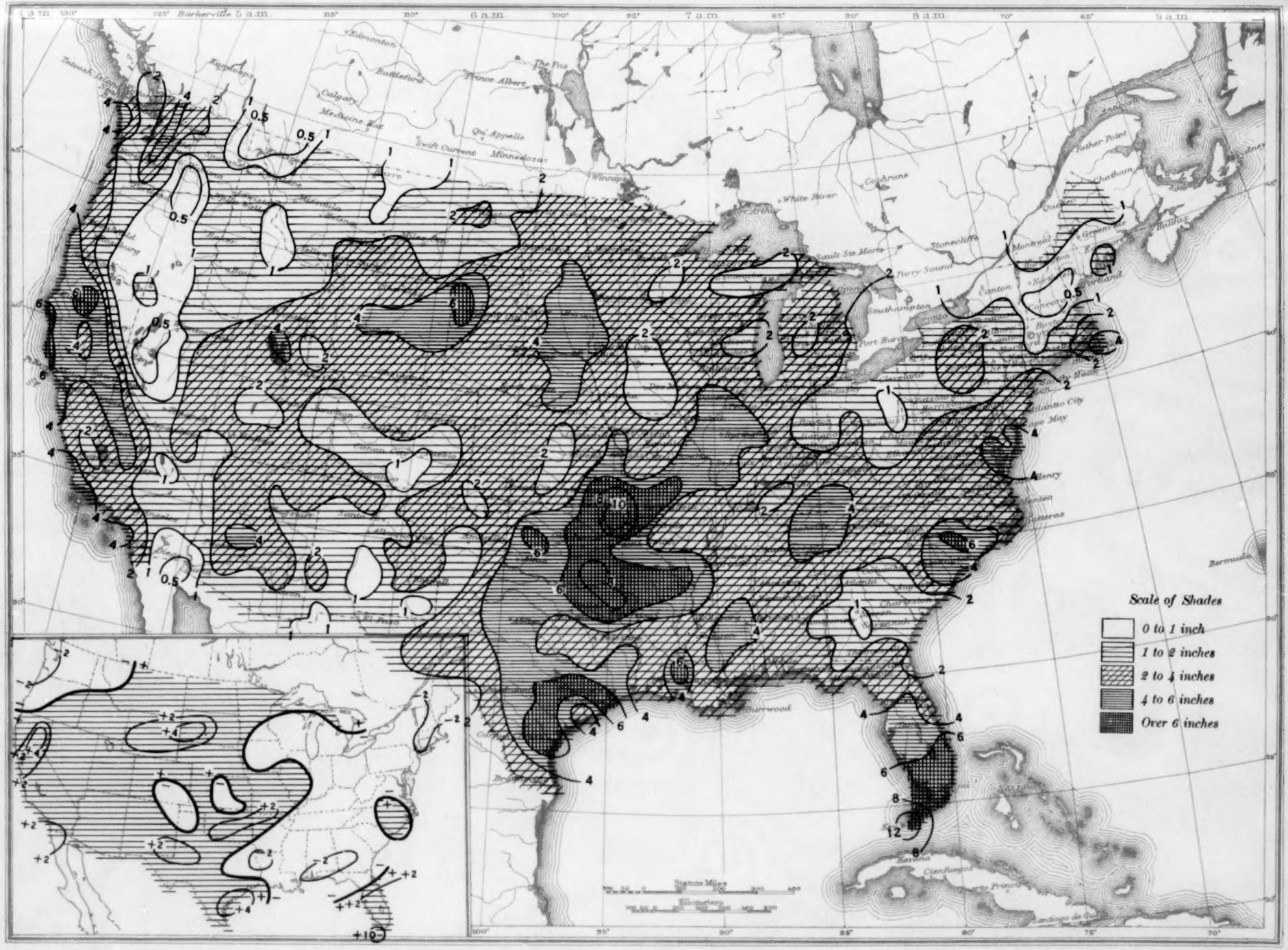


Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, April 1941

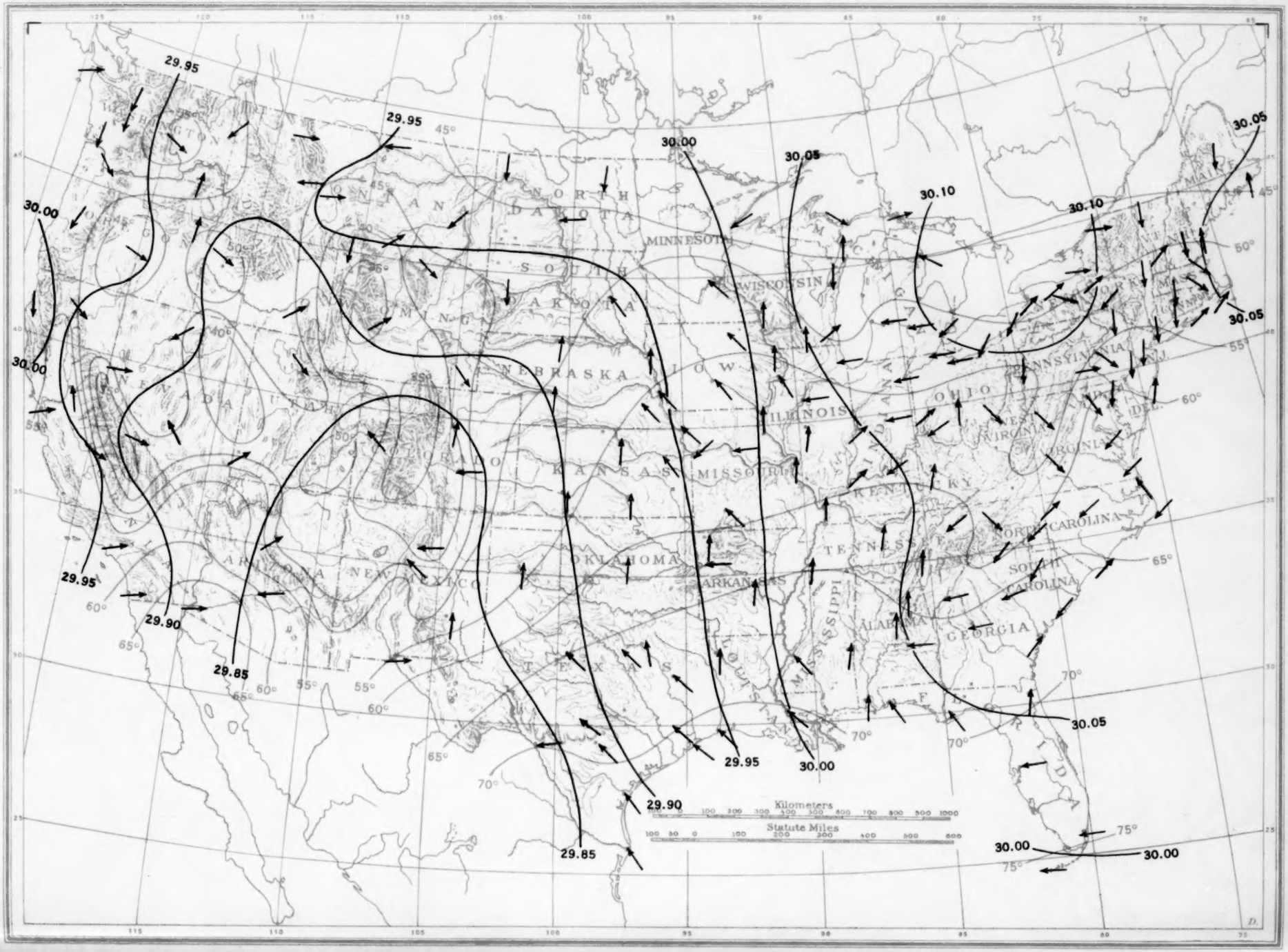


Chart VII. Total Snowfall, Inches, April 1941.

Chart VII. Total Snowfall, Inches, April 1941.

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.) and Isotherms (°C.) and Resultant Winds for 1,500 Meters (m. s. l.) April 1941

Isobars and isotherms based on radiosonde observations at 12:30 a. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.).

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.) and Isotherms (°C.) and Resultant Winds for 1,500 Meters (m. s. l.) April 1941

Isobars and isotherms based on radiosonde observations at 12:30 a. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.).

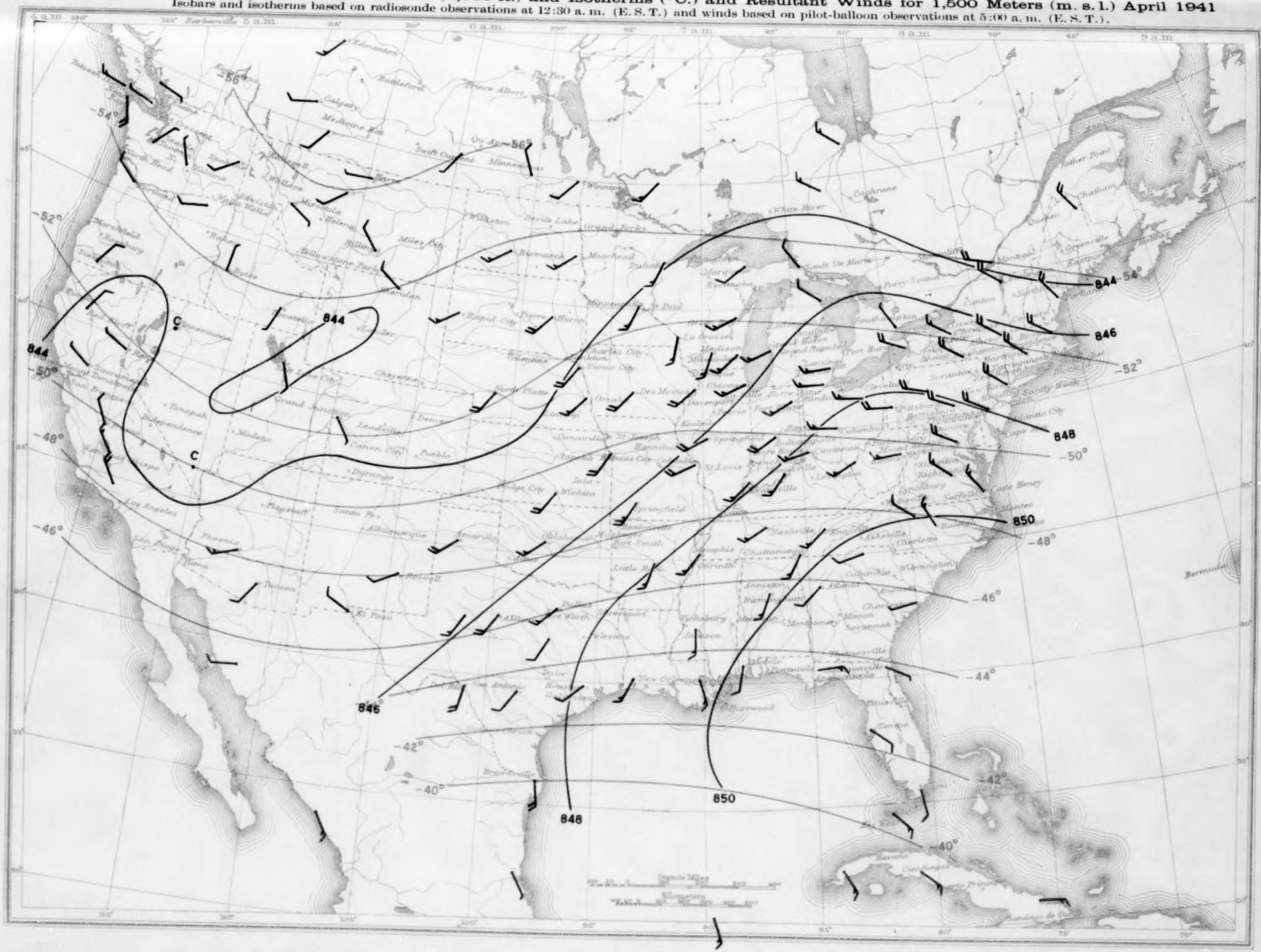


Chart IX. Isobars (mb) Isotherms (°C.) 1:00 a.m. (E.S.T) and Resultant Winds 5:00 a.m. (E.S.T.) for 3,000 Meters (m.s.l.) April 1941

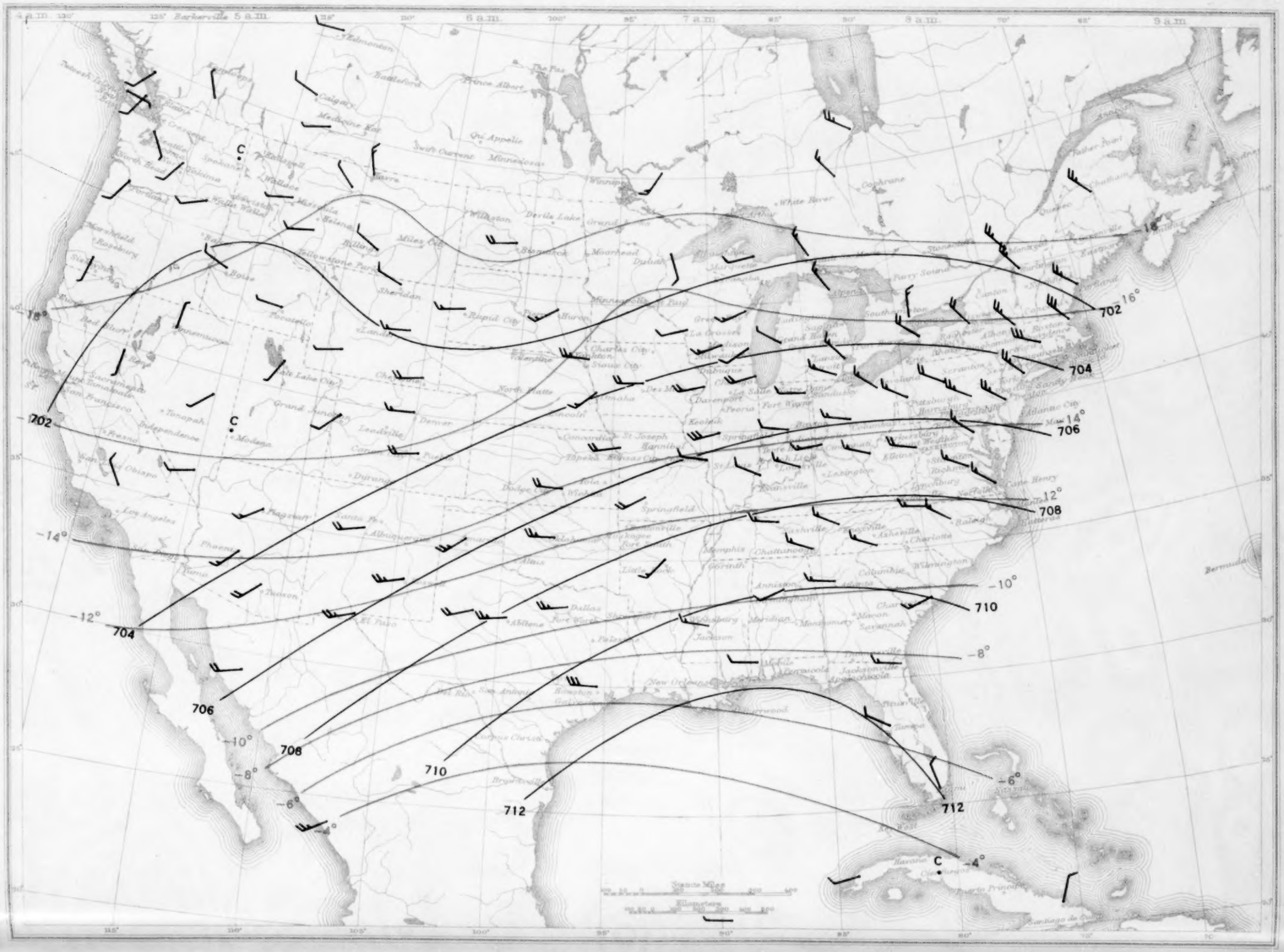


Chart X. Isobars (mb) Isotherms (°C.) 1:00 a.m. (E.S.T.) and Resultant Winds 5:00 p.m. (E.S.T.) for 5,000 Meters (m.s.l.) April 1941

Chart X. Isobars (mb) Isotherms (°C.) 1:00 a.m. (E.S.T.) and Resultant Winds 5:00 p.m. (E.S.T.) for 5,000 Meters (m.s.l.) April 1941

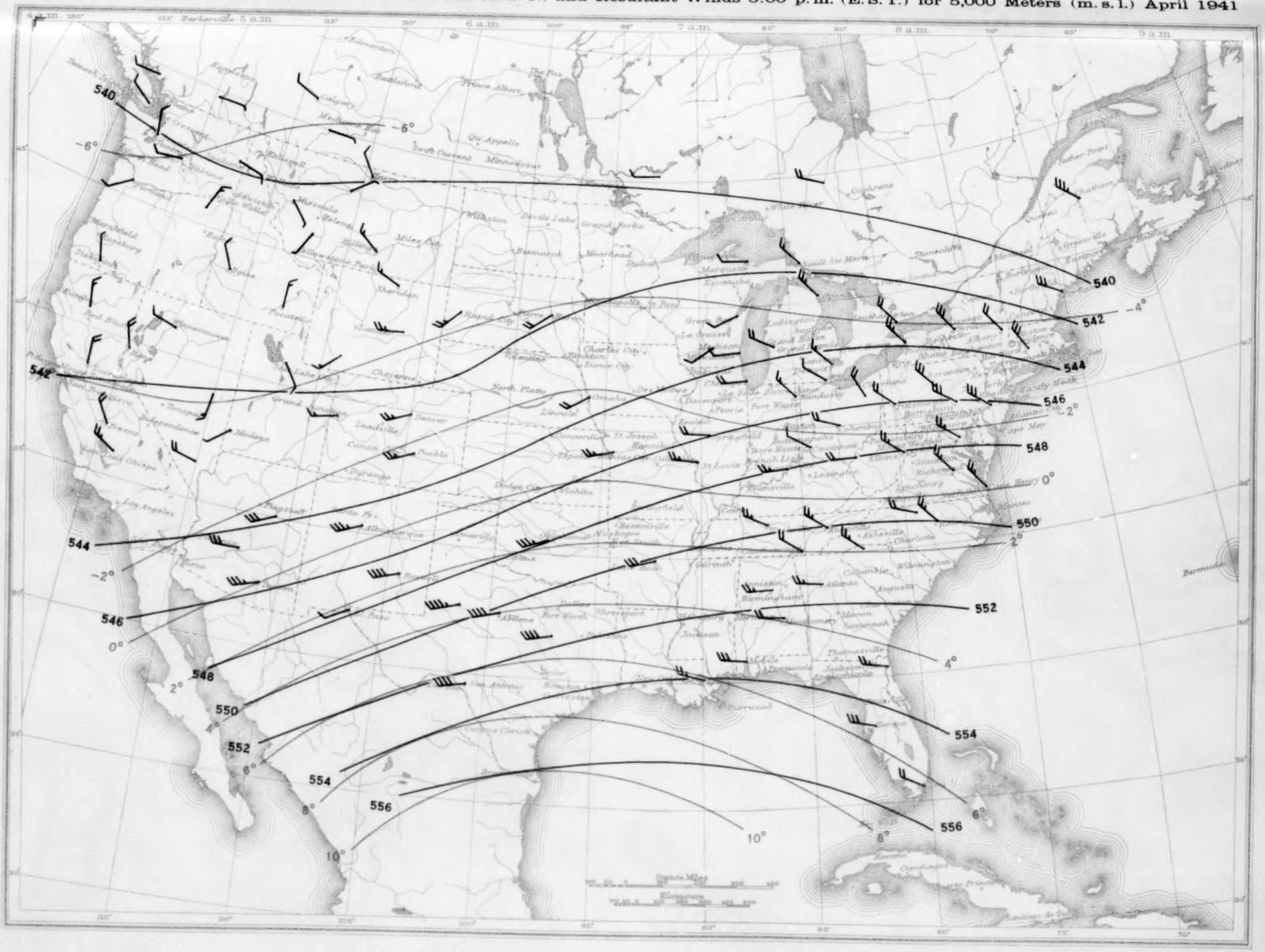
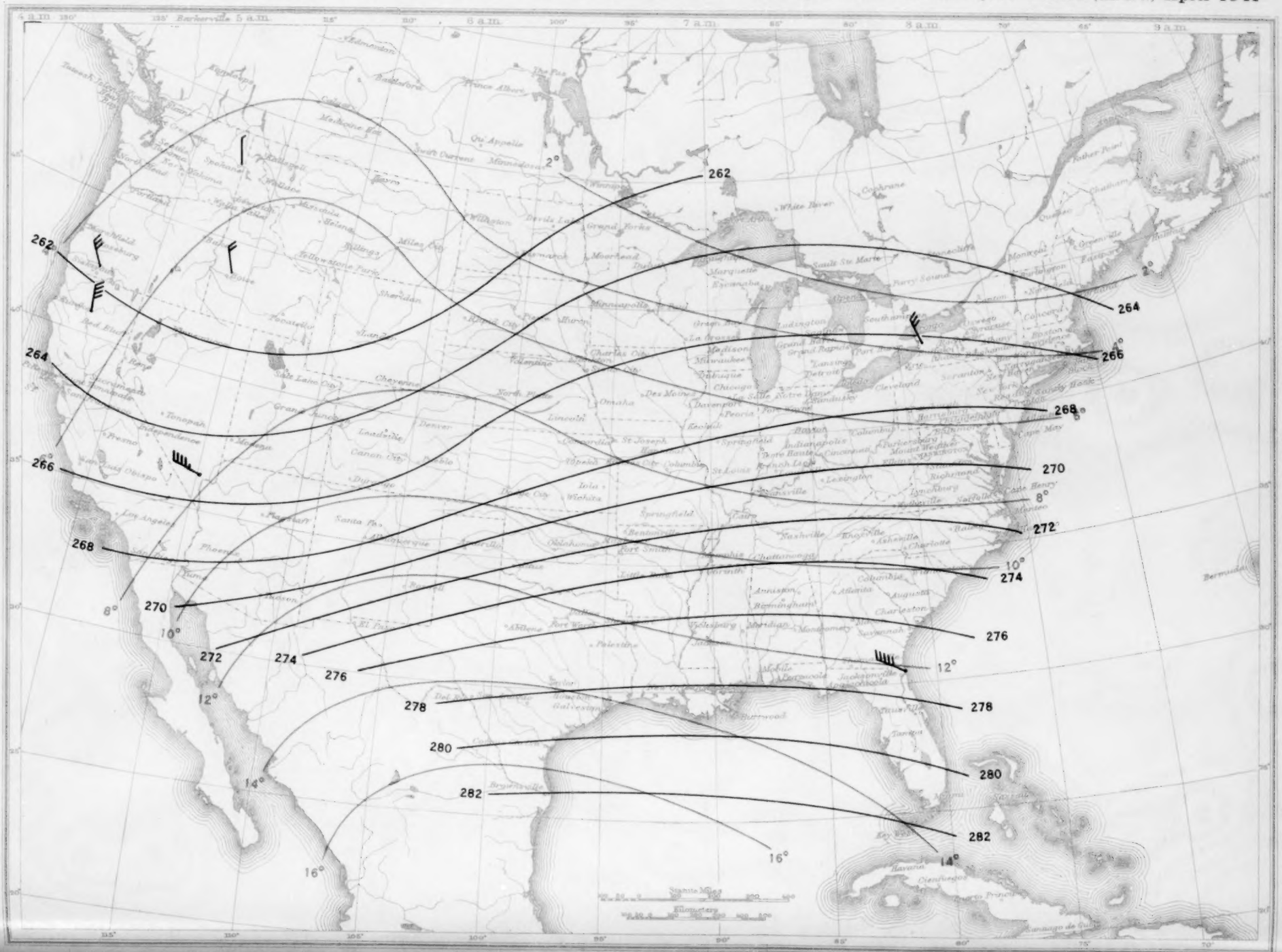



Chart XI. Isobars (mb) Isotherms (°C.) 1:00 a.m. (E.S.T.) and Resultant Winds 5:00 p.m. (E.S.T.) for 10,000 Meters (m.s.l.) April 1941